

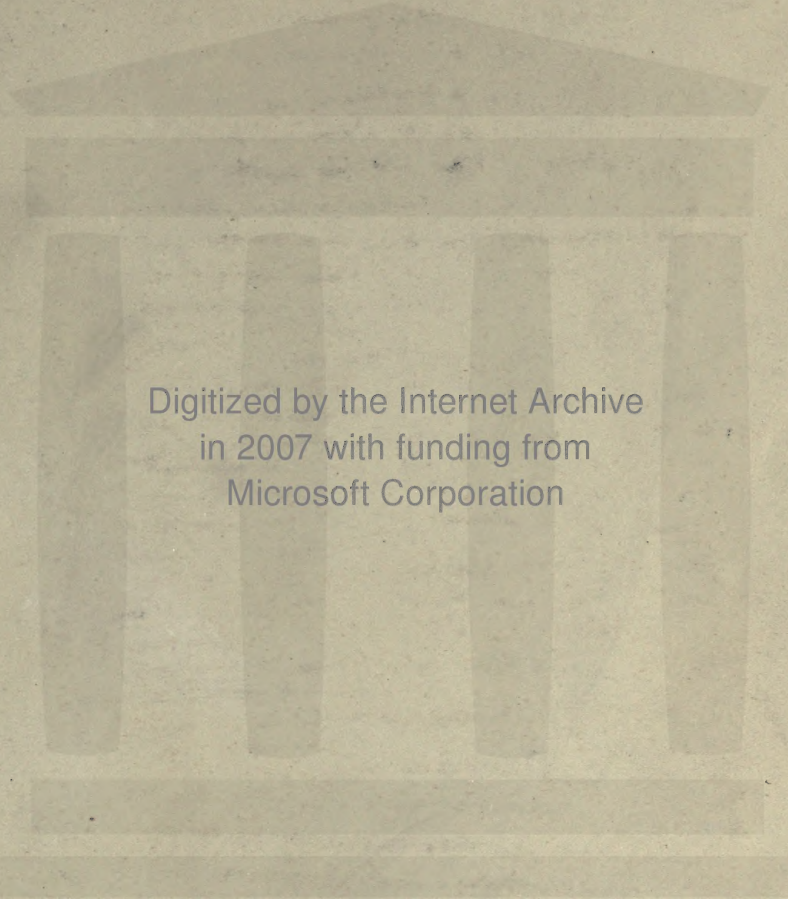
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A GEOGRAPHY
OF THE
BRITISH EMPIRE

BUNTING AND COLLEN



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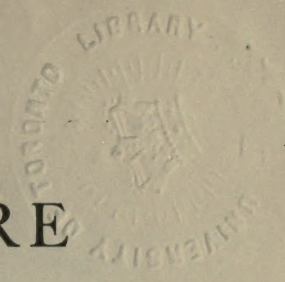
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A GEOGRAPHY OF THE BRITISH EMPIRE



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PREFACE

THIS book is intended for the use of higher classes in Preparatory, and lower classes in Public Schools. Though the ground covered is limited, the authors have followed mainly the lines laid down in the Syllabus adopted by the Headmasters' Conference of 1910.

The early part makes no pretence at fullness or scientific exactitude, but is to be regarded as the minimum of introduction to an elementary work of this kind; moreover, throughout the course it is expected that the teacher will supplement the outlines laid down by illustrations of his own selection.

The treatment in detail of the different parts of the British Empire is consistent throughout, and is designed to lay emphasis upon important geographical principles and act as a guide to the study of regions outside the scope of this book. The chief interest in the study of the geography of any country lies in an examination of the relation of its inhabitants to geographical factors, and an attempt has been made to show how these factors work together to produce certain definite effects.

On the assumption that an Atlas is indispensable, and that the pupil should do as much individual work as possible, references to the Atlas and questions demanding Atlas-work are used with freedom. Blank spaces are inserted where it is important that the pupil should record the conclusions he reaches as a result of such Atlas-work: thus he will have at his command self-made data of many kinds which he may use as standards of comparison in further geographical work.

The maps referred to are such as will be found in any good school Atlas.

The authors wish to make grateful acknowledgments to the High Commissioner of the Commonwealth of Australia for supplying statistics and criticising that part of the text which deals with Australia, and to the Agent General for the Dominion of Canada for providing the latest census returns. Thanks are also due to Mr G. A. R. Callender and Mr H. G. Hughes-Games for their kindness in reviewing other portions of the book. Finally the authors have to thank the Rev. W. J. Barton, of Winchester College, for permission to use the diagram on p. 29, of which he is the designer.

W. L. B.

H. L. C.

June, 1913

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A GEOGRAPHY OF THE BRITISH EMPIRE

INTRODUCTION

The Earth. The earth is one of a number of bodies, called **planets** (=wanderers), which journey round the sun in varying periods of time.

Notice in the Atlas the names of the other planets. Which is the largest of them?

Its shape and size. The shape of the earth is almost that of a perfectly round ball, or **sphere**. The surface is of course not smooth, but its roughnesses are very small in comparison with the size of so large a body; in fact, if you had an exact model of the earth sufficiently small to be handled easily, you would not be able to detect any roughness of its surface. You will realize this more clearly when you learn that **the circumference is 25,000 miles**; this represents more than 40 times the distance from the north of Scotland to the south of England.

If the circumference of your model was 10 feet, by what would a mountain 5 miles high be represented?

Its movements. As the earth journeys round the sun, it spins or **rotates**, just as a ball might be made to rotate on a wire running through the middle of it.

The line about which the earth rotates is called its **axis**, and the two ends of this axis are **the north and south poles**. A line drawn completely round the earth midway between the two poles is called the **equator**, and divides the surface of the earth into two equal **hemispheres** (= half spheres).

We have said that the earth is not an exact sphere; we find that the diameter measured through the poles is rather less than that measured through the equator, from which it is obvious that the earth is slightly flattened at the poles.

This difference, however, is so small that you would not be able to detect it on the model to which we have previously referred.

The diameter of the earth is about 8000 miles.

Let us now examine rather more fully the two motions of the earth.

Revolution. The earth takes a year to travel completely round the sun, and its path is called the earth's **orbit**. The axis is not perpendicular to the plane of the orbit, but is inclined at an angle of $23\frac{1}{2}^{\circ}$ to the perpendicular, and always moves parallel to itself.

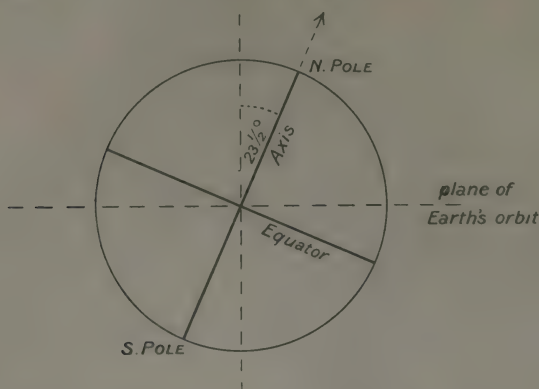
This motion gives us our **seasons**; for when our part of the earth's surface is tilted towards the sun, the sun's rays will shine more directly on us, and we shall experience our summer. In the same way, when tilted away from the sun, the rays will reach us in a more slanting direction, and will not therefore have such a warming effect; this will be our winter.

In what way would our seasons be altered if the earth's axis was perpendicular to the plane of its orbit?

ROTATION OF THE EARTH

Rotation. The earth takes 24 hours to rotate completely on its axis.

How many miles per hour does (i) the north pole, (ii) a point on the equator travel?



This motion gives us alternate **day** and **night**, for as only half the sphere is illumined by the sun at one time, it follows that one-half is in light while the other is in darkness.

How would day and night be affected if the earth did not rotate on its axis?

The inclination of the earth's axis also plays an important part in the question of day and night. If it were not inclined, day and night would always be of equal length in all parts of the world; but owing to the inclination, and to the fact that the earth revolves round the sun with its axis always parallel to itself, it will be seen that the length of daylight varies in different parts of the world, and that near the poles there is no daylight at all at certain times of the year.

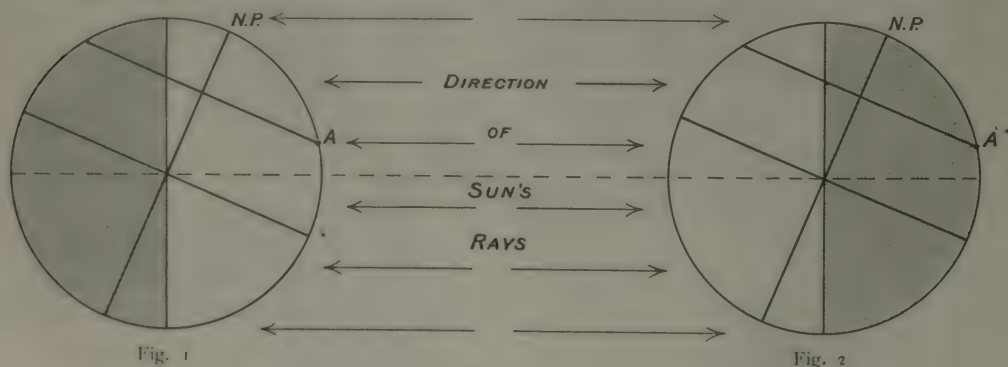


Fig. 1

Fig. 2

Figure 1 shows the tilt of the north pole towards the sun at midsummer.

Figure 2 " " " " away from " " midwinter.

It will be seen that a place *A* in the northern hemisphere has more hours of day than night in the summer, and more of night than day in the winter. The reverse is true of a place in the southern hemisphere.

Where are days and nights always equal?

The outer surface. We have as yet said nothing about the materials of which the earth is formed. Originally it was a mass of molten material in a state of extreme heat, and it is certain that the interior is still intensely hot: *e.g.* in the course of mining operations it has been found that the temperature increases 1° F. for every 60 ft. of descent.

What does our experience of volcanoes and hot springs tell us of this?

The outside crust however has become solid by the process of cooling which has been very slow, and it is important for you to understand that the internal heat has no effect upon the surface, which derives all its warmth from the sun. This outer surface of the earth consists of two distinct parts, land and water. If we look at the Atlas we shall find that the water area is much larger than that of the land (in fact it is nearly three times as large), and is divided up into **oceans** and **seas**, the land being divided into **continents** and **islands**. We further notice that the land is unevenly distributed over the globe, by far the greater amount lying in the northern hemisphere.

Land Forms. The **continents** are grouped in two masses, the Old World and the New World.

Notice the continents that make up the Old World and the New. The greater length of the Old World is east and west; that of the New World, north and south.

The following table gives a rough idea of the relative sizes of the continents if we adopt Europe as the unit of measurement:

Asia	$4\frac{1}{2}$	Africa	3	N. America	>2	S. America	<2
Europe	1	(i.e. about $3\frac{3}{4}$ million square miles)				Australia	$\frac{4}{5}$

Islands are either continental, *i.e.* broken off from continents (*e.g.* the British Isles), or oceanic, *i.e.* of volcanic (*e.g.* Seychelles) or coral formation (*e.g.* Bermudas). Oceanic islands are generally small, and surrounded by deep water; continental islands vary in size from very small (*e.g.* I. of Wight) to very large (*e.g.* Borneo), and are mostly surrounded by comparatively shallow water.

Of the many and varied land forms the following must be noted particularly:
(Find in the Atlas the examples given, and write definitions on page 5.)

Mountain and Hill. Rocky Mountains. Cotteswold Hills.

[N.B. There is no exact dividing line between mountain and hill; it is generally a matter of comparison; *e.g.* what might be called a mountain in one country would only be considered a hill in another.]

Valley. Thames valley.

Watershed. Forest Ridges of the Weald.

Plain and Plateau. Siberian plain; Tibet plateau.

Pass. Khyber Pass.

Isthmus. Isthmus of Panama.

Peninsula. Malay Peninsula.

Water Forms. The **oceans** are all connected with one another, and in this respect differ from the land areas. The two largest are the Pacific and Atlantic, each of which separates the Old World from the New.

The chief terms connected with the water area are as follows:

Sea (subdivision of an ocean). Arabian sea.

„ (enclosed). Mediterranean sea.

„ (partially enclosed). North sea.

„ (inland). Caspian sea.

Bay. Bay of Bengal.

Gulf. Persian Gulf.

Strait. Strait of Gibraltar.

Lake. Lake Superior.

River and Estuary. Ouse and Humber.

The Earth's Crust.

We must now consider briefly the materials of which the crust of the earth is composed. Though we do not know exactly how old our earth is nor when it first became habitable, we are certain firstly, that it has been many millions of years in arriving at its present state, and secondly, that the various rocks were formed at different times often separated from one another by immensely long periods. As the surface is mostly covered with soil, it would be difficult to learn of what the crust is formed, were it not that in certain places (*e.g.* quarries and cliffs) the formation is laid bare to the eye. From our observation of these we find that the rocks fall into two main divisions—**Igneous** and **Sedimentary**.

Igneous rocks (Latin, *ignis* = fire).

These either owe their origin to the cooling of the molten material which formed the earth's crust, or are of volcanic formation. The former (*e.g.* granite) are very old, but the latter (*e.g.* basalt) may occur in any age from the earliest up to modern times. Both are very hard and, if broken with a hammer, they will fall into a number of pieces of no definite shape. They are of immense service to man in that the older of them contain the chief supply of the world's minerals, while the volcanic rocks, when decomposed, form a most fertile soil.

Sedimentary rocks.

These are so called because they are composed of "sediment" deposited in horizontal layers (usually in water): these layers may be formed of particles of the crumbling surface of older rocks (*e.g.* sandstone) or of the remains of animals that have lived in the sea (*e.g.* chalk), and the particles, at first separate, become bound together and hardened, if subjected to pressure. When broken, these rocks split into fragments of a flaky appearance with smooth faces. In contrast with igneous rocks they are soft and contain fossils of many kinds.

How do fossils help the geologist to tell the age of rocks?

Changes on the Earth's Surface.

We have seen how most of the rocks have been originally formed and may note here that if the surface remained undisturbed we should always find the newer rocks lying on the top of the older. But observation shows us that the surface has been, and is, continuously undergoing changes, which are for the most part extraordinarily slow, but occasionally are extremely sudden: **these changes are due to action either from the inside or from the outside.**

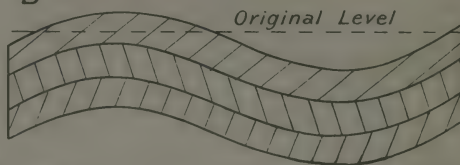
(1) **From the inside: A. Slow and gentle movements.** On the floor of the sea we find traces of forests long ago submerged: or perhaps high above present sea-level we meet with an old sea-beach: and again, we find hill-ranges sometimes of 1000 feet in height made of chalk, which we know is formed of the remains of myriads of minute sea animals deposited on the sea-floor. The processes which result in changes of such a kind cannot be observed actually at work but are so slow that they can only be measured by comparisons made at long intervals. As the interior of the earth cools, it contracts, and the solid crust tends to fall in upon the shrinking interior: thus there is a constant bending up and down of the surface which results in parts rising and other parts subsiding. Cf. the following diagram:

A



A. A portion of the surface showing three different layers, or strata—undisturbed.

B



B. The same portion, showing rising and subsidence, after lateral pressure has been exerted.

This movement has not disturbed the balance between land and water over the whole globe, because subsidence in one region is counterbalanced by rising in another. In this way ridges are formed and if the earth's crust is weak where the ridging, or crumpling, is taking place, the ridges will be magnified into mountain-ranges. The surface of elevated regions, after the crumpling has occurred, may show igneous and sedimentary rocks confusedly mingled together as a result of immense lateral pressure. In this case the softer materials will be worn away by action which we shall describe shortly, while the harder rocks will be left appearing as mountains by contrast with their worn-down surroundings.

B. Sudden and violent movements: volcanoes and earthquakes.

When we remember firstly, that parts of the crust are weaker than others, and secondly, that the interior of the earth is intensely hot, we can imagine that at points of extreme weakness heated material (lava and ash) from the interior may force an outlet through the crust. Thus much material is added to the surface both on land and on the sea-floor. [Seeing that mountains are generally ridged up along lines of weakness in the crust, we shall expect to find the majority of volcanoes in mountainous regions.] At times a pile of lava and ash is formed round the opening, making a cone of the type of Vesuvius. Such a formation is called a **volcano**. At other times lava streams out of the crack and spreads widely over the neighbourhood in great sheets such as we find on the western coasts and islands of Scotland: or the volcanic ash may be blown out in the shape of fine dust and carried many miles by wind before settling down: for instance, after the 1902 eruption of Mt Souffrière in St Vincent, dust several inches thick fell on the island of Barbados a hundred miles away.

We have all felt the vibration caused by the passing of a heavy train, or a traction-engine. From time to time parts of our surface suffer vibration on a large scale, and such vibrations are called **earthquakes**: they often occur in regions of volcanic

activity but are more often due to sudden slips among adjacent masses of rock, brought about by the tremendous strain on the crust which follows upon the contraction of the interior. Earthquake shocks may be violent enough to destroy whole cities in a few moments (*e.g.* San Francisco in 1906) or they may be so slight that their occurrence can only be recorded on the most delicate instruments (seismometer).



San Francisco after the earthquake

(2) **From the outside: Erosion** (Latin, *erodere* = to eat away). As soon as the land appears above the sea, it is at once attacked by outside forces which shape its surface in a variety of ways. The chief agents are heat, frost, wind, and water, and they work together in a never-ending cycle, destroying, transporting and building. By the action of the sun's heat the surface-particles are reduced to a crumbling state. When water in surface-soil or rock freezes, it expands and the particles of soil or rock are pushed apart from one another. In both cases we observe that these particles (varying in size from grains of soil to fragments of rock) are now ready to be removed by wind and water. They are removed in smaller or greater quantities from one region to another by wind: and by water they are transported from higher to lower levels. The water that runs down the side of a road after heavy rainfall carries along (amongst other things) particles crumbled from the road and deposits them as sediment at a lower level. Similarly in the case of rivers great and small, material is removed from banks and bed and washed down stream, the river itself all the time helping to widen and deepen its course in the valley, and though some of it is deposited on surrounding land if the river overflows its banks, the greater part finds its way to the sea. There it will be deposited on the sea-floor and so form a delta or a bar unless the tide is strong enough to remove it elsewhere and keep the channel clear.

In high mountain regions snow takes the place of rain and the rivers are of

snow or ice, called glaciers [Latin, *glacies* = ice]. These, like rivers, destroy and build, but on a much larger scale.

In addition to rivers, the sea also is at work, constantly destroying, transporting, and building. The coasts, like the surface of the land, are subject to the attacks of heat, frost, or wind, and the loosening action of these agents is helped by the dashing of rocks and pebbles against the coast. The material thus washed away is swept along the coast by the action of the tides till it is piled up either against some obstruction or in the estuary of a river or in a sheltered bay, making the water shallow and ultimately extending the shore-line seaward. A low-lying shore built in this way is called a "dune" coast. The character of a coast, whether it is indented or not, depends upon the material of which it is formed and the degree of violence to which it is subjected by the waves: if the material is all hard or all soft, the coast-line will be worn away regularly, though of course faster in the latter case: but if hard and soft materials alternate, the sea will eat its way more quickly into the softer material, forming bays and inlets, and leave the harder standing out as promontories. The most indented coasts, *e.g.* Norway or the west coast of Scotland, are formed partly in this way and partly by subsidence of the coast regions which allows the sea to penetrate openings in the coast and drown the valleys for considerable distances: such are called **fiord-coasts**.

To sum up, amongst the chief results of the work of interior and exterior forces, we must particularly note the following:

(a) Interior and exterior forces interact upon one another without ceasing: a region may rise and subside several times during a long period of time, and parts of the land which have been pushed up from below the sea may again be brought below it, to be in turn again pushed up.

(b) The ridging of the surface may alter the arrangement in which the various rocks have been laid down, mingling together the igneous and sedimentary.

1. *How are sand-hills on the sea-shore and sand-dunes in a desert formed?*
2. *Why are sand-banks found more commonly in the lower than the upper course of a river?*
3. *Why are the mouths of rivers that flow into enclosed seas generally obstructed with a delta?*
4. *Why are stones seldom found at the mouths of rivers?*
5. *Why do water pipes burst in winter?*

Latitude and Longitude.

We must now learn how we can accurately describe the position of places on the earth's surface. The position of a point on a sheet of paper might be fixed by drawing two lines through it at right angles to each other, one from the top edge and one from the side; the point of intersection would be described as so many inches from the top, and so many from the side.

But when we turn to the globe we find that there are no definite edges from which to take our measurements. The only definite line that we have is the equator, and we are able to say how far a place is to the north or south of it. This distance is called the **Latitude** of the place.

The **Latitude** of a place is its distance from the equator, measured to the north or to the south.

To enable us to reckon latitude more readily lines are drawn on the globe in the shape of circles parallel to the equator and at equal distances apart, but diminishing in size as they approach the poles. These are called **Parallels of Latitude**.

If we had another fixed line, similar to the equator, running round the globe in a north and south direction, we should then be able to say how far a place is to the east or west of this line, and the position of the place would then be absolutely fixed.

Now as the earth rotates on its axis every 24 hours, each place on its surface will at some time be brought directly opposite to the sun, and will then have its midday; it will thus be seen that at all places exactly north or south of it midday will occur at the same time. If lines are now drawn on the globe from the north to the south pole, all places which are situated on any one of these lines will have midday at the same moment. Such lines are called **Meridians** (Latin, *meridies* = midday).

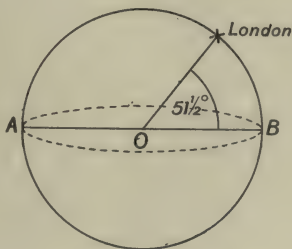
Notice that the meridians run north and south, and are all of equal length, but they are not parallel to each other, since they all meet at the two poles.

If we now select one of these meridians as a starting line, we can measure the distance of a place to the east or west of it. This distance is called the **Longitude** of the place, and most countries now adopt for this purpose the meridian which passes through the national observatory at Greenwich.

The **Longitude** of a place is its distance from the **Meridian of Greenwich**, measured to the east or to the west.

Thus by giving the latitude and longitude of a place we can determine its position as the point of intersection of a meridian and a parallel. We must be careful, however, to state whether latitude is to be measured to the north or south, and whether longitude is to be measured to the east or west, besides giving the distance in each case.

Dotted line = plane of equator
 AB = diameter of equator
 O = earth's centre



It would seem natural to measure latitude and longitude in miles, but as a matter of fact they are usually measured in degrees; thus, the latitude of the north pole is said to be 90° N., because a line joining the north pole to the centre of the earth makes an angle of 90° with the direction of the equator. Similarly, when we

say that the latitude of London is $51\frac{1}{2}^{\circ}$ N. we mean that a line from London to the centre of the earth makes an angle of $51\frac{1}{2}^{\circ}$ with the direction of the equator, or that London is $\frac{51\frac{1}{2}}{90}$ of the distance from the equator to the north pole.

In the case of both latitude and longitude the starting lines (*i.e.* the equator and the Meridian of Greenwich) are marked 0° , and the degrees are divided into minutes and seconds.

On examining a globe we find that there are 180° of longitude on either side of the Greenwich meridian, but only 90° of latitude on either side of the equator.

It is a simple matter to convert degrees of latitude into miles, or *vice versa*; for since the circumference of the earth is about 25,000 miles, the distance of either pole from the equator will be $\frac{1}{4}$ of this, *i.e.* about 6250 miles. If this distance is then divided by 90 we find that each degree of latitude is equivalent to nearly 70 miles.

(i) *How many miles is London distant from the equator?*

(ii) *What is the latitude of a place which is 2100 miles south of the equator?*

In the same way longitude is measured in degrees, but since the meridians all meet at the poles, and are consequently not the same distance apart throughout their length, it will be seen

(i) that a degree of longitude is equivalent to 70 miles, only if measured along the equator,

(ii) that the value of a degree, in miles, diminishes as you proceed towards the poles,

(iii) that at the poles the value of a degree is nothing at all.

It will therefore be wrong to say that a place whose longitude is 10° W. is invariably $10 \times 70 = 700$ miles west of the Greenwich meridian; this will only be true if the place is on the equator.

Find from the globe in what countries are situated the positions whose latitude and longitude are here given:

(i)	Lat. 20° N.	Long. 80° E.
(ii)	" 10° S.	" 50° W.
(iii)	" 55° N.	" 120° W.
(iv)	" 30° S.	" 145° E.

By drawing lines on the globe in certain definite latitudes, we divide the surface into five belts or zones which are named according to the amount of heat experienced in each; thus the belt nearest the equator is called the **Torrid** (=hot) zone, those nearest the poles are called the **Frigid** (=cold) zones, and the intermediate, the **Temperate** zones. The diagram will show the boundaries of these zones and the name given to each.

The Arctic and Antarctic circles are each $23\frac{1}{2}^{\circ}$ from the poles, while the Tropics of Cancer and Capricorn are each $23\frac{1}{2}^{\circ}$ from the equator.

Insert the latitude of all the parallels which form the boundaries of the zones.

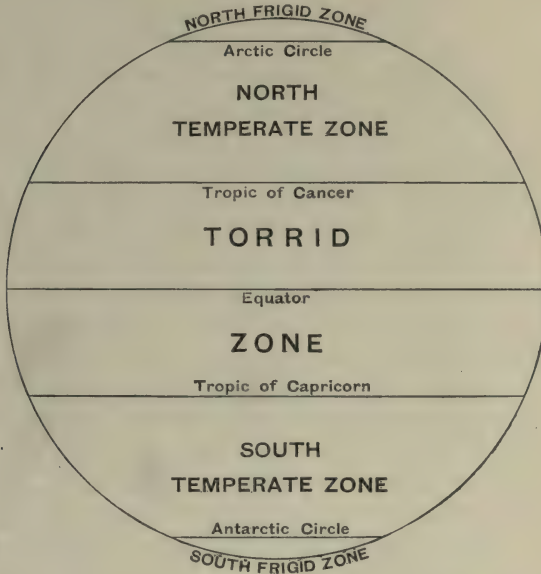
In what connection have we previously referred to the angle $23\frac{1}{2}^{\circ}$?

The Torrid zone is often spoken of as "The Tropics," *i.e.* the belt which lies between the Tropic of Cancer and the Tropic of Capricorn.

(i) *What is the width of the Torrid zone in degrees? How many miles is this equivalent to?*

(ii) *How long will it take to cross the North Temperate zone at the rate of $21\frac{1}{2}$ miles an hour?*

(iii) *In which zone are the British Isles situated?*



Note. In measuring distances at sea a nautical mile is used. This is rather longer than a land or statute mile, and a degree of latitude is equivalent to only 60 nautical miles, instead of 70 statute miles.

A speed of one nautical mile per hour is called a **Knot**.

A ship is in latitude 16° N. If she sails due south for four days at the speed of 15 knots, in what latitude will she then be? How many more days will be required for her to reach latitude 16° S.?

Maps.

A map is a picture of the earth's surface, or any part of it. The simplest form of a map of the globe would show the outline of the land and sea areas, their shape and position. This can only be done exactly on a globe, because the earth is a sphere, but for the purpose of an atlas we can make maps of large or small portions of the earth's surface, and can show in them, besides mere land and sea outlines, any special features that we wish to emphasize, *e.g.* the different heights of land, or the different forms of vegetation.

No maps can be drawn life-size, and as it is of the greatest importance to be able to tell the distance from one point to another on our map, we must know to what extent it has been reduced. And so maps are constructed in such a way that all distances in them are a certain fixed fraction of the actual distance they represent. This fraction is called **the scale of the map**; e.g. find the number of inches in a mile, and then note that if one inch on the map is to represent a distance of one mile, the scale is described as $\frac{1}{63360}$ or 1 : 63360. This is a larger scale than any in your Atlas, and is only suitable for maps of small districts; it is one of the scales used in the ordnance survey maps of the British Isles.

By looking at any page in your Atlas you will find another way of showing the scale of a map; there you will notice that the larger the area that is drawn in the map, the smaller must the scale be, and *vice versa*.

All the maps in your Atlas are reduced, some more and some less, and just as it is impossible to represent exactly a globe-map on a flat surface, so, when a portion of the globe is represented in a flat map, there must be some inaccuracies.

But these are not very serious except in the case of the maps known as "Mercator" maps. This type of map was invented in the 16th century by Mercator, a Dutchman, for the use of sailors. He drew the meridians parallel to one another throughout their length, so that as he went further and further N. or S. of the equator he found that countries extending over a certain number of meridians on a globe had to be increasingly stretched on his map in an E. and W. direction: then, in order to preserve the true shape of the countries, it was necessary to widen the distance between the parallels also—just as you, if changing a square from a small scale to a bigger, would enlarge it equally in all directions.

You must, therefore, remember carefully that in maps of this sort (and in wall-maps drawn on Mercator's projection—as it is called) areas of land and sea are more and more exaggerated as you get further from the equator; and also that distances in an east and west direction are not so great as they seem: e.g. on the Mercator map of the world, measure, in inches, the distance on the equator from meridian 20° E. to meridian 140° E.; the number of nautical miles between these two points is $120 \times 60 = 7200$. Now measure the distance in inches from Cape Town to Adelaide; you will find it is the same number of inches on the map, but the actual distance is only 5603 nautical miles.

We conclude then that in a map on Mercator's projection areas of land and sea are correct in shape but incorrect in size, and that the map is not constructed to any one fixed scale. Notice that in such maps no scale is given. Near the equator there is little inaccuracy, but in high latitudes there is much exaggeration; e.g. Compare the relative sizes of Africa and Greenland on a Mercator map and a globe-map. Which map gives the correct relation?

1. *Can you see why a Mercator map is useful to sailors?*
2. *Would a Mercator map be of any use to an Arctic explorer?*

Now that we have seen how horizontal distances can be accurately represented we have to consider how it is possible to show the different heights of land or depths of sea. To reckon these vertical distances we must have some fixed starting

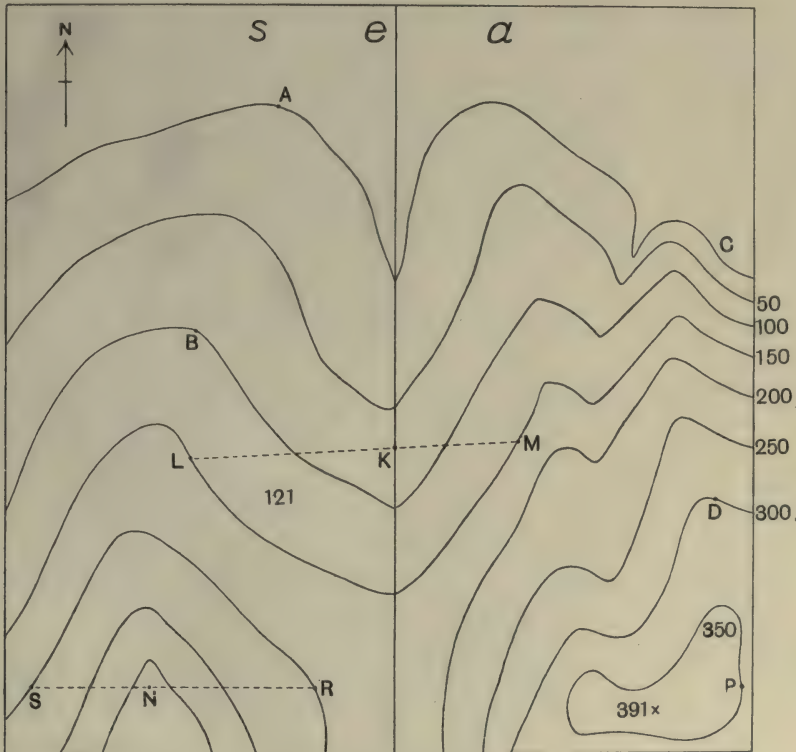
point, and that is sea-level. The line of the sea-coast passes through points of the same level and is called the **natural contour-line**. Each successive contour-line, drawn on the landward side, represents what would be the sea-level if the sea rose to that particular height, or on the seaward side if the sea sank to that particular depth, and each contour-line must be marked with the number of feet above or below sea-level that it represents.

On page 15 write a definition of a contour-line.

These lines will vary in shape with the irregularities of the surface and will accurately show details of land forms such as hills and valleys.

In the Atlas differences of level are shown by colouring, but you will see that the lines which separate one colour from another are really contour-lines.

Note throughout the Atlas what shades are used for the lower-lying lands, and what for the higher.



Map 1. 1:63360, i.e. 1" represents 1 mile

Consider Map 1 above (divided into an E. and W. section). The coast-line lies to the north and the contours represent a difference of level of 50'. The difference of level between two successive contours is called the **Vertical Interval**,

and generally the same interval is used consistently on any map; this is always the case in an ordnance map, but not always in your Atlas because the scale is so small. Intermediate heights are marked, where necessary, by figures (*e.g.* in this map, the heights of 121' and 391').

Firstly, notice that the contours are not drawn at the same distance apart in the E. and W. section of the map. Let us see the meaning of this.

Draw a straight line from *A* to *B*. Measure this line carefully; look at the scale of the map, and find the distance in miles. The difference in level is 100'; find the average gradient (*i.e.* slope) from *B* to *A*, expressing it as 1 foot in so many feet. Follow the same procedure with a line drawn from *D* to *C*. Compare the two slopes, and write down the inference you make with regard to contours drawn close together and far apart.

Secondly, in the centre of the coast note an opening. The contour-lines to the south of this are drawn in a **V** shape with the open end turned towards the coast, whereas just to the west they are drawn in the shape of an inverted **V** with the closed end towards the coast.

Through *K* is drawn a dotted line from *M* to *L*. Imagine yourself starting at *K*. Shall you walk uphill or downhill to reach *L* and *M* along the dotted line?

In the same way, starting at *N*, shall you walk up or down to reach *S* and *R*? Which of the two lines crosses a valley and which a ridge?

[Write down a description of the type of contour-lines that represent a valley.]

Can you find instances of similar country in the E. half of the map?

There is one course for a river in the E. half; draw it in, starting at the highest possible point.

Examine the Atlas, and notice instances of river valleys shown by the shape of the contours.

Examine Map 2 on page 16.

1. The vertical interval is 250'. Mark in the height of all the lines not marked already.

2. Draw in the five rivers.

3. Mark a pass with the sign **JL**.

4. Mark the watershed with a dotted line.

5. Could a man standing at *L* see another standing at *K* or at *M*?

6. What do the contours round *P* represent?

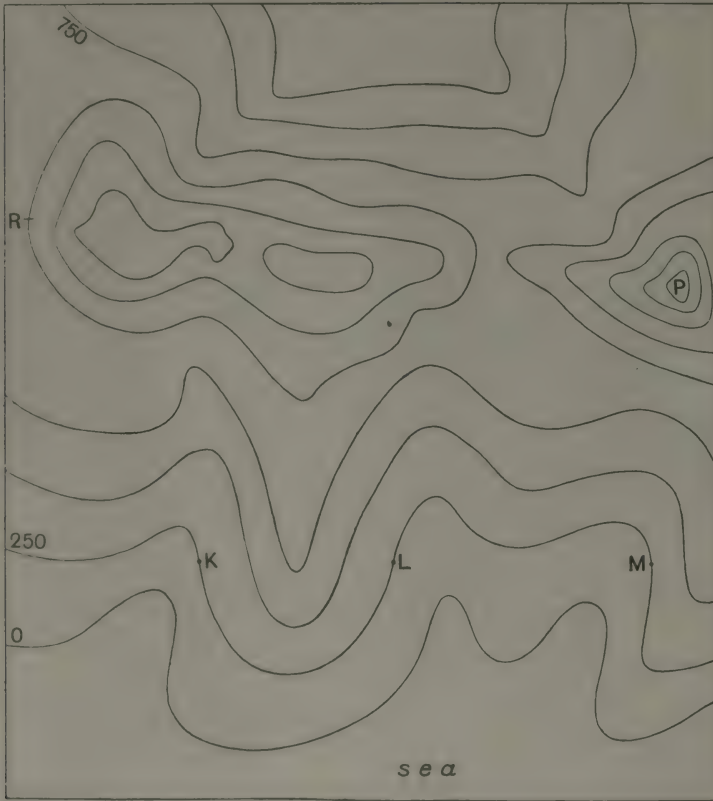
Draw a contour map of an island, showing on the N. side a harbour with steep shore and deep water (sea contours should be dotted); on the S. side a river flowing out into an estuary with shallow water; and on the W. side a ridge of high ground ending in a promontory.

For examples of sea contours examine the Atlas. Notice whether the depths are given in fathoms (1 fathom=6 feet) or feet.

We can thus read rapidly a contoured map as easily as a map in which colours are used to show the differences of level.

But if we want to examine in detail the character of the country along any line we must draw a **section** which will show us a sky-line picture along that line. The

manner in which this is done is shown on the opposite page (Map 3), and it is a great convenience to have squared paper for this purpose. We have adopted a vertical scale of $\frac{3}{16}"$ to represent 100', and each point where the straight line AB (draw this in) cuts a contour-line is represented in the section at its proper level. By joining together all the points which we obtain in this way we get the sky-line picture that we want. At the bottom of the map the same section is drawn with a vertical scale of $\frac{1}{16}"$ to represent 100'.



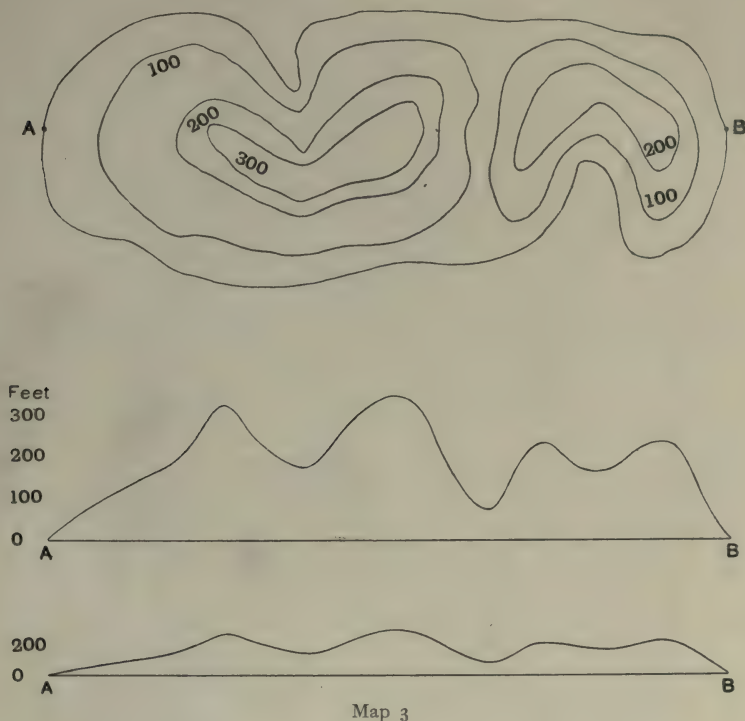
Map 2

Note: (i) When you have two successive points at the same height be careful to find out whether your connecting line should be drawn above or below them; never draw it perfectly straight.

(ii) In practice you will place the edge of your squared paper along the line AB , then mark on that edge the points where the contours are cut by AB , and finally transfer these points to their proper levels.

The vertical scale can never be the same as the horizontal scale, owing to the fact that vertical heights are so small in comparison with horizontal distances on the

globe. You can prove this for yourselves by consulting the physical-feature map of England and filling in the blank spaces below; if you were drawing a section across England along the parallel 54° N., the horizontal scale would be ... miles to an inch. Now with the same vertical scale the greatest height (*i.e.* 1500') would be represented by only ... inch approximately, and it would thus be impossible to draw a section.



Heights must therefore be always exaggerated, but the exaggeration should be within reasonable limits.

If in the above example a vertical scale of 1000' to 1" is used, how many times will the heights then be exaggerated? Answer this same question with reference to your map of N. America.

From Map 1 draw a section from *S* to *P*.

" " 2 " " " *P* to *R*.

Using Atlas " " across Ireland in Lat. 53° N.

Climate.

If you were asked to describe the climate of your country, you would think first of all of the greatest heat and cold you had experienced, and of the wettest and driest years that you could remember. Then you would realize that you were thinking only of exceptional conditions of the atmosphere and that unless you could

describe the average conditions, your information would not be very accurate. But the average conditions could only be obtained from figures of temperature and rainfall, and so you would have to consult the records of the thermometer and the rain-gauge. By taking the average of the daily weather records over a number of years (the more the better), you could give a satisfactory account of your country's climate.

The important elements of climate are (A) **Temperature**, (B) **Rainfall**.

Notice in the Atlas how the distribution of temperature is shown by **isothermal lines** (or isotherms). These might be called contour-lines of heat, as they pass through places where the thermometer records the same average temperature: in the map you find the average for a summer and a winter month, marked in degrees of the Fahrenheit scale.

Notice also the method of showing the varying amounts of rainfall, and the length of the period to which the given number of inches refers. When we speak of the annual rainfall of a country, we refer to the depth in inches which would measure all the rain that had fallen during the year, supposing that none had escaped in any way.

The chief influences that affect climate are (1) Latitude, (2) the direction of the prevailing winds, (3) Altitude.

(A) **Temperature.**

(1) **Effect of Latitude.**

The isothermal map shows us that within the Tropics the sun's heat is greatest and that it diminishes as we get into higher latitudes. If the surface of the earth were all land or all water, the temperature would vary simply with the latitude, and you can find in the same map certain latitudes where this is almost perfectly illustrated: but it is not the case where the surface consists of land and water areas side by side, and we must find out the cause of the difference.

(2) **Effect of the direction of the Prevailing Winds.**

Your own experience tells you that though the wind does not always blow from the same quarter, it comes in this country more frequently from somewhere between S. and W. than from anywhere else, and this S.W. wind is, therefore, our prevailing wind. Other parts of the world also have their prevailing winds and the following diagram shows that these steady winds are found in particular latitudes.

Note that the Trade Winds occupy the middle areas of the globe and that outside of them is a belt of westerly winds in each hemisphere; the shaded areas are belts of calms or else of variable winds.

Now a solid body gets hotter and colder much more quickly than a liquid, and consequently the sea (a liquid) is warmer in winter than the land (a solid), because it retains some of the warmth received in summer longer than the land which has cooled more quickly: the sea is also cooler in summer than the land, because it does not acquire the warmth of that season so quickly as the land: the sea, therefore, is always lagging one stage behind the land both in receiving and giving out warmth.

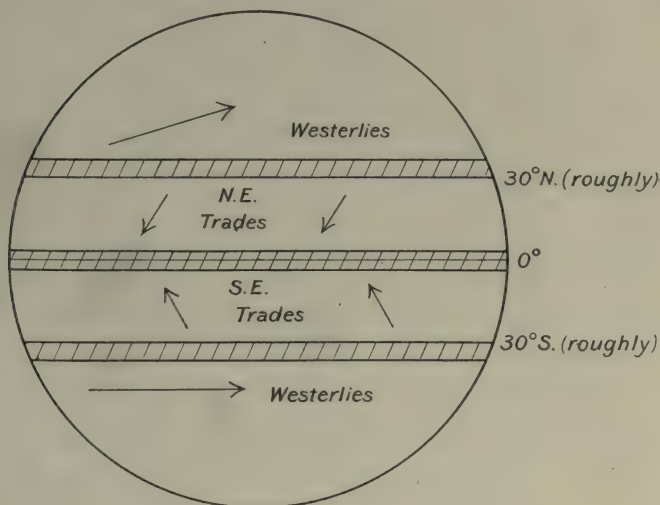
Now turn to the isothermal map and fill in the blank spaces with the right temperature figures :

January

In Lat. 60° N. { Long. 0° the temperature is° F.
 { Long. 40° E. " " "° F.
 { Long. 80° E. " " "° F.

July

In Lat. 40° N. { Long. 122° W. the temperature is $^{\circ}$ F.
 { Long. 110° W. " " " $^{\circ}$ F.



Owing to the difference between temperatures on land and sea in summer and winter, a region near the sea will in any case be warmer in winter and cooler in summer than one far from the sea: and the above figures show that if, in addition, the region near the sea has a prevailing wind off that sea, the temperature will be still higher in winter and lower in summer than you would expect in that latitude.

Again fill in the blank spaces below:

In Lat. 53° N.	{	Long. 80° E. (Central Asia)	{	the Jan. temperature is	.....° F.
			{	" July	" "
	{	Long. 3° W. (Liverpool)	{	" Jan.	" "
			{	" July	" "

The greater range of temperature in Central Asia is described as "Continental," the smaller range of Liverpool, as "Maritime."

(3) **Effect of Altitude**—*i.e.* height above sea-level.

The tops of mountains are often covered with snow when at the foot there is no sign of it. [Compare on a map of India the perpetual snow of the higher Himalayas with the Ganges valley below.] This shows that it is colder at high levels than at

low, and experiments prove that temperature decreases at about the rate of 1°F. for every 300 feet of ascent.

In isothermal maps altitude is disregarded and the temperatures recorded are those which would occur at sea-level: therefore, when looking at a region which you know to be mountainous, remember to make the necessary deduction from the temperature figure given: *e.g.* the temperature of Quito (in the Andes) on the equator is given as 75°F. in July: but the elevation is about 9000 ft. What will be the actual temperature in the city?

(B) Rainfall.

Moisture is evaporated from the surface of the sea to form clouds: these again are condensed to form water which falls as rain.

(1) Effect of Latitude.

Where heat is greatest most moisture is evaporated from the ocean surface: thus, roughly speaking, equatorial regions will experience heavy rainfall.

(2) Effect of Prevailing Winds.

A wind blowing over a large sea area will obviously collect more moisture than a wind which blows over a large land expanse; thus regions where the prevailing winds are immediately off the sea will get heavier rainfall than those further inland.

[If you have a rainfall map of the British Isles, draw a rough curve to show the rainfall along parallel 52°N. from W. to E.]

(3) Effect of Altitude.

Examine the physical-feature map of the world, noting the regions where the land is very high. Turn to the rainfall maps to find out whether those regions appear to have much rain or not. Maps of the British Isles illustrate the same point, namely, that high regions have a heavier rainfall, as a rule, than low. This is because the surface winds carrying moisture find their path obstructed by the mountain masses and are forced up to a greater height in order to pass over them; as we have seen, the higher you go, the colder it becomes, and a low temperature condenses the moisture so that there is heavy fall of rain.

Generally speaking, we can lay down these simple rules, which you must remember—Rainfall is heavier in windward than leeward areas, and heavier also in high than low country: it is heaviest where the windward regions are also high.

In conclusion:

(a) A "continental" climate suggests great summer heat and winter cold.

A "maritime" climate shows only a small difference in temperature between summer and winter.

(b) In temperate zones, the "continental" climate should be connected in your mind with a smaller rainfall, and the "maritime" climate with a heavier.

We can now realize what an important part is played by climate in the study of Geography. It is largely the difference in climatic conditions which prevents all parts of the land surface from having the same natural productions and an even distribution of population.

For instance, you know that some weather conditions are favourable, and others unfavourable, to particular products: you can see from the Atlas how the productions of a temperate country like Canada differ from those of a half-tropical country like India, and this difference will decide the agricultural occupations of these countries.

Using the maps which show the distribution of Vegetation, Temperature and Rainfall, examine the Great Victorian Desert of Australia, the Amazon Valley, the tundras and the higher Himalayas. Here we observe that temperature and rainfall conditions make some regions very hot, others very cold, some very dry and others very wet. Now remember that Man is largely dependent on agriculture for the means of life, and then examine these same four regions on the map showing distribution of population. You will see that climate, partly of itself and partly because it decides how far regions are capable of cultivation, has a very great effect upon the distribution, the occupations, and the health of the inhabitants of the globe.

1. *Why does the sun's heat diminish as we advance into higher latitudes?*

2. *Why are the isotherms more regular in direction south of latitude 35° S. than anywhere else on the globe?*

3. *What should be the prevailing wind of a country lying between 16° N. and 25° N., and of one lying between 39° S. and 47° S.?*

4. *Are the windward coasts of continents on the E. or the W. (a) in high latitudes? (b) in low latitudes?*

5. *Why is the difference between January and July temperatures greater outside the Tropics than inside?*

6. *In what zone should you expect to find the heaviest rainfall?*

Introductory Survey of the British Empire.

The British Empire contains about a quarter of the world's population and covers a quarter of the land surface of the globe; it is composed of units of different sizes, ranging from the few square miles of St Helena or Aden up to the Dominion of Canada—an area as large as Europe. About half the area is situated in the N. Hemisphere and half in the Southern: so widely distributed are the various portions that every variety of climate and soil can be found in them, and thus the Empire can furnish products—both necessities and luxuries—of almost every kind.

The growth of so large an Empire has of necessity been very gradual. In the early days of history, all the great Empires, such as that of Rome, were land-empires, gained by gradual advances over land in different directions, and it was not till the age of the Great Discoveries (1480—1520) that a sea-empire became possible. From that time onwards there has been a continuous struggle amongst the European powers to acquire over-sea possessions. The Spaniards and Portuguese were the first to reap the benefits of the work of discovery, and supported by Pope Alexander VI they agreed to divide all new lands between them, the Spaniards claiming everything west of meridian 40° W. and the Portuguese everything east. This arrangement at first discouraged English mariners and the only successful expedition from England in the period of the Discoveries was that of Cabot which sailed from Bristol to Newfoundland and the mainland of Canada in 1497. But the discovery of the

New World had entirely altered the position of the British Isles: instead of being on the outskirts of Europe and remote from the commercial centres of the Mediterranean and the Continent, they were now found to be in the centre of the land hemisphere and nearer to N. America than any other European country. This change of position turned our eyes seawards and particularly to the West, and within 100 years of Columbus' voyage (1492), the adventurous sailor heroes of Elizabeth's reign—Drake, Hawkins, Raleigh and others—proved once for all that Spain was not invincible and that England might secure a share in the trade with the new lands and even acquire possessions of her own. We may, therefore, date our first steps in empire-building from the time of Elizabeth when the supremacy of the sea passed from Spanish into British hands.

Between 1580 and 1680 trading settlements or colonies were established, largely by private enterprise, in N. America (Virginia and New England), W. Africa, India and the East Indies, and we established our long connection with the W. Indies by the capture of Jamaica. But in effecting these results we had to struggle continuously against European rivals, particularly the Dutch during the last 30 years of this period. They had inherited the commercial supremacy which Spain had enjoyed before the Armada disaster, and fought hard to exclude our traders from the E. Indies and to retain for themselves the carrying trade of Europe.

From 1680 our chief opponents were the French, and our long contest with them lasted till the end of the Napoleonic Wars, 1815. But over all our continental competitors we had one immense advantage—our geographical position as an island, with no land boundary to guard. The effect of this was seen in two ways: firstly, we were often able to hold aloof from continental wars and to increase our foreign possessions and trade by sea, while our rivals were busy on land fighting one another: and secondly, our attention was even more than before concentrated on the sea, and from the time of Blake, the great Commonwealth admiral, the importance to us of a strong navy came to be more and more clearly understood.

With the help of this advantage we came successfully through the wars with the Dutch: again later, because France in the War of the Spanish Succession (1700—1713) was involved in conflict with so many of her neighbours, we increased our possessions at her expense (or that of her allies) by the addition of Nova Scotia, Newfoundland and Gibraltar. After a short interval our contest with France was renewed and continued through the century that followed the Treaty of Utrecht (1713). Not only was she our near neighbour and ancient enemy in Europe but also our rival in two other quarters—India and Canada—which we desired to make our own. Our chance came during the Seven Years' War (1756—63) in the course of which all French Canada fell into our hands as a result of Wolfe's victory at Quebec; at the same time the French power in India was so entirely broken that subsequent administrators had only to develop the work so ably begun by Clive. From time to time additions were made as a result either of wars or negotiation with rulers of native states and the British Government has itself directed the affairs of the whole of India since the time of the Indian Mutiny, when the old East India Company was abolished (1858).

The last half of the 18th century saw the first real check to our colonial development: owing to the unwise policy of George III and his advisers, the N. American Colonies revolted in 1776 and won their independence. As some compensation for this severe loss, before the end of Napoleon's time our hold over the W. Indies had been strengthened by important naval victories, our first settlements had been made in Australia (1788), and we had gained at the expense of the Dutch a permanent footing in South Africa (Cape Colony). Since then we have extended our Empire continuously, either by expanding Colonies only the fringes of which we had so far settled, or by adding numerous possessions of a smaller size; many of these latter have been chosen as outposts in convenient positions to guard the shipping-routes to and from our important Colonies: just as intermediate positions between distant parts of the Empire were important as *dépôts* for stores and provisions in the old sailing-days, so to-day they are as coaling-stations no less essential. Examine, for instance, the routes to the Far East and Australia: notice how Gibraltar and Aden command the western and eastern entrances to the Mediterranean: how Colombo is the natural junction of routes in the Indian Ocean, with Mauritius to watch the route from the Cape to India: how Singapore overlooks the chief passages from the Indian into the Pacific Ocean, and Thursday Island the route round the N. of Australia: and finally how Hong-Kong stands as a sentinel over the last stage of the route to China and Japan.

Such very briefly is the story of the growth of our Empire: in conclusion, observe particularly the following points:

(1) Trade was the chief motive of the first builders of the Empire: trade is more successfully carried on by private individuals than by a Government, and a mention of such bodies as The Turkey Co., The East India Co., Hudson Bay Co., The British South Africa Chartered Co., suggests how much we owe to private enterprise in making beginnings in different parts of the world. Moreover, in the same way as trade has been the chief cause of expansion, it still remains one of the most important bonds of union between the Home Country and the Colonies.

(2) At first we exercised little choice in selecting our new possessions: we took by force many that had proved valuable to Spaniards, Dutch or French. But later, when it became necessary to find new lands for our surplus population, our choice was influenced (except in the case of India) by a geographical consideration—the need of finding regions where the climate was suitable for settlement by Europeans. And so we occupied most of the empty spaces of the earth which lie in temperate latitudes and as they have been proved to be productive beyond all expectation, Canada, Australia and South Africa must always remain the most valuable of our Colonies. These three, with their temperate climate and comparatively scanty native populations, are gradually being settled and developed by our own people and have already reached the position of self-governing states; whereas India, with a more tropical climate, and with a dense native population requiring most of the natural resources of the country for its own needs, offered few inducements to British settlers, and instead of becoming a Colony in the true sense of the word, has remained a Dependency, of which we are the guardians and administrators.

THE BRITISH ISLES.

The British Isles consist of England and Wales, Scotland, Ireland, and many small islands chiefly to be found on the west. The total area is about 120,000 square miles, *i.e.* one-thirtieth of the size of Europe: England and Wales together represent roughly a half, and Scotland and Ireland a quarter each of the whole area. In latitude they lie between 50° and 60° N., high in the Temperate Zone.

[Find what countries in the Old and New World are in the same latitude.]

Situated off the N.W. coasts of Europe, they command the entrances to the North Sea from the Atlantic and, till the discovery of the New World placed them in the centre of the Land Hemisphere, their position was somewhat remote from the centres of civilisation, *i.e.* the countries bordering on the Mediterranean.

They belong to the class of islands that we have called "continental" (cf. p. 3) and the sea contours suggest that they rest on a submarine shelf which long ago was all land and connected them with the mainland.

[Find the shortest distance across Dover Strait.]

This shelf is nowhere more than 100 fathoms (600 ft.) below sea-level and as the depth of water increases very rapidly about a hundred miles to the west of Ireland and Scotland, we conclude that the 100 fathom contour-line was the original coast-line of the Continent. Our islands, then, are the highest parts of this region, which remained above the sea after the sinking of the whole area. The surface-feature map shows how much would remain above the sea if a further sinking of 600 ft. were to take place. Of the many other proofs of our original connection with the mainland we need only mention the following: the chalk ridge which ends in the cliffs at Dover re-appears on the coast of France opposite and the coal that lies beneath the chalk in Kent is also found in N.W. France: this suggests that there was originally no break between these same geological formations on either side of the Strait.

The surrounding Seas and the Coasts.

[Find the names of the surrounding seas, the principal openings in the coast, and the shortest distance across St George's Channel and the North Channel.]

Our coast-line is deeply indented and thus immensely long in comparison with our area, and the shape of our islands and the position of the indentations ensure that no part of the country is more than 70 miles from the sea.

You will find that the western coasts are very broken and the eastern are more regular in outline: the eastern half of the south coast resembles the latter; the western half, the former.

This difference is due to the different aspect of the land surface of the western and eastern parts. The slope of the land is from N.W. to S.E.: the mountains of the west terminate in massive peninsulas or high rugged cliffs and the seaward ends

of the valleys have been invaded by the sea as a result of the sinking of the whole land below its former level: the W. coast, therefore, is an example of a fiord-coast (cf. p. 8).

But on the lower-lying E. side, the coast merely marks the seaward border of the plains, interrupted here and there by the ends of hill-ranges which form cliffs, generally low, and by occasional river estuaries. This coast, with its long stretches of sand-hills, we call a dune-coast.

[Find instances of fiords on the W. coast and river estuaries on the E. What coasts on the Continent can be compared with our E. and W. coasts?]

The character of the coast is of great importance to a country: the best harbours are either fiords—with their deep water—or sheltered river mouths, the latter only inferior because much dredging must be done to enable the large modern vessels to enter at all states of the tide. Ports are wanted for naval purposes and commerce: in both cases shelter and deep water are essential, but their importance will also depend largely upon position: naval ports must be well-placed for making or repelling attacks in the most likely directions; a commercial port, too, as being the meeting-place between land and sea traffic, should be conveniently situated in relation to the foreign countries with which it chiefly trades and to the districts at home which require imported materials and which produce or manufacture goods for export.

As our E. and S. coasts face the Continent, there you will find our chief naval harbours and some of our chief commercial ports; of these, London and Southampton nowadays have a larger trade with countries beyond the seas than with the Continent so near them, but none the less they became important originally by reason of their traffic with the mainland.

Look up the following: consider whether you would class them as naval or commercial ports, and whether their trade will be chiefly with the Continent or with countries beyond the seas: Glasgow, Liverpool, Bristol, Hull, Plymouth, Chatham, Dover, and Portsmouth.

Why is it that so many of the fiords on our W. coasts are not used as harbours?

Why are all the big ports of Ireland on the E. or S. coast, though the best harbours are on the W.?

The Surface-Features.

(a) Mountains, hills, and lowlands.

Examine the map to obtain a general idea of the arrangement: to the N. and W. of a line from Start Point to Flamborough Head are mountains, to the S. and E. are only hills. We may divide the mountains into the following groups:

(1) The Highlands of Scotland occupy most of the country N.W. of a line drawn from Glasgow to Aberdeen: the two chief divisions are the N.W. Highlands and the Grampians, separated by the narrow valley of Glen More, through which runs the Caledonian Canal. At the S.W. end stands Ben Nevis, 4400 ft., the highest mountain in the British Isles. Most of the rocks of this district are ancient and very hard, showing traces of volcanic action: *e.g.* in the islands of Staffa and Iona.

(2) The Southern Uplands, Pennines and Cumbrians form a practically continuous group: the S. Uplands are separated from the Highlands by the Central Plain of Scotland, and from the Pennines by the Tyne Gap: further South the Aire Gap offers another means of passing from E. to W. of the mountains without going higher than 500 ft. The Cumbrians are joined to the Pennines by a shoulder known as Shap Fells. In the Cumbrians and Pennines are several heights over 3000 ft.

Find the names of these heights.

There are lowlands both E. and W. of this chain, narrow on the W. till you reach the Cheshire plain but broader on the E., where they are broken by the Yorkshire Moors and the Yorkshire and Lincolnshire Wolds. The rock-formation of the Pennine group is largely limestone, of the kind called "Carboniferous," on account of the coal-measures which occur with it.

(3) Separated from the Pennines by the Midland Gap are the Cambrians, which occupy nearly the whole of Wales, leaving only narrow coastal strips of lowland. Heights of 3000 ft. occur in N. Wales (Snowdon) and the rocks are of very ancient formation, as are also those of Devon and Cornwall, which rise to a maximum height of more than 2000 ft.

The mountains of Ireland are almost equally distributed round the Great Central Plain (not far from the coasts), but in this rim of high land there are two noticeable breaks—in the centre of the E. and W. coasts.

Notice that the break on the E. coast lies directly opposite the Midland Gap, encouraging communication in early times between the ports of Chester and Dublin, while on the W. coast, Galway, which was a port of some importance two or three centuries ago, occupied a position in the break similar to that of Dublin.

S. and E. of the line from Start Point to Flamborough Head we must distinguish two groups:

(a) A range of limestone (newer than that of the Pennines), which begins with the Cotteswolds, continues through the Northampton Uplands and Lincoln Edge, and terminates in the Yorkshire Moors.

(b) Chalk ridges, starting from the region of Salisbury Plain and radiating in three directions:

1. through the White Horse Hills, Chilterns, E. Anglian Heights, and Lincoln Wolds, up to the Yorkshire Wolds;
2. the North Downs, terminating in Dover Cliffs;
3. the South Downs, ending with Beachy Head.

Separating these ridges from one another or from the sea are lowlands or low plateaux: the Fens, Thames Valley, Eastern Plain, Hants and Sussex Plains, Midland Plateau and Salisbury Plain. The Weald, separating the N. and S. Downs, was once much higher ground than at present but has been lowered by erosion: it still contains much high ground and cannot be called a plain. Evidence of its former elevation appears in the fact that many streams flow both to the N. and to the S. reaching the Thames Valley and the English Channel.

No hill in these groups attains a height of as much as 1500 ft.

Mountains are an important feature of the geography of a country: their position

largely decides the direction, length and character of the rivers: they affect the climate, as we have seen already (cf. pp. 19, 20): the way in which their rocks have been upheaved may render it easier to reach important mineral deposits, such as coal; and lastly, they may act as political boundaries, like the Cheviots.

Examine the surface-features of Wales and see if you can understand why Wales has never had a capital.

(b) The Rivers.

Rivers are chiefly valuable in providing a drainage system and in supplying a means of cheap inland water-transport for commerce. Our islands are unusually well-provided with rivers, but from the point of view of transport, their insignificant size (our longest river is only $\frac{1}{20}$ of the length of the Amazon) prevents them from being navigable for ocean-going ships very far up, and only the largest are suitable even for small steamers and barge-traffic. In fact, the most valuable parts of our rivers are their estuaries, in the shelter of which are most of our large ports. Though many of these have to be dredged continuously, we are fortunate in having tides strong enough to prevent the formation of deltas and to help by their scouring action in keeping a clear channel.

[With regard to the value of river-valleys in making communications easier, we shall have more to say later.]

As the mountains are nearer the W. coast than the E., our longer and more navigable rivers flow in a more or less eastward direction: the Clyde and the Shannon are the chief exceptions. (Note that the Severn, though its outlet is on the W. coast, flows eastward for the greater part of its course.)

In Scotland, the chief rivers are the Clyde, Tay, Forth and Tweed: the estuaries of the first three contain the largest ports of the country, while the Tweed passes through a particularly fertile valley and is for some distance the boundary between England and Scotland.

In England and Wales you must notice the following rivers: flowing westward from the Pennine Chain—the Eden, Ribble and Mersey; flowing eastward—the Tyne, Tees, Ouse, Aire, Don and Trent; flowing from the Welsh mountains into the Bristol Channel—the Severn (and tributary, Warwickshire Avon); and from the Cotteswolds, the Bristol Avon. Of these the Ribble, Mersey, Bristol Avon, Tees and Ouse (Humber) have important estuary-ports, while the Tyne is navigable for ships up to Newcastle, and the Trent, flowing slowly over the plain, is suited for barge-traffic for the greater part of its course. The Severn, rising at a considerable height, is rapid in its early course, but is navigable for small steamers continuously from Stourport down to the mouth; between Gloucester and the sea its course is so winding that most vessels use the Berkeley Ship Canal instead. Of other Welsh rivers only the Usk and the Wye are worthy of mention, the former on account of its estuary-port, the latter because it flows through some of the most beautiful scenery in England.

S. and E. of the line from Start Point to Flamborough Head none of the rivers are of much importance except the Thames. This river is more than 200 miles long;

from London Bridge downwards the estuary forms the Port of London, and above the bridge the river is navigable for small craft for nearly 100 miles, and is connected with the Severn estuary by the Thames and Severn Canal.

Find in the map the chief tributaries of the Thames.

The slowly flowing rivers of the Fen District (*e.g.* Great Ouse) are robbed of much of their usefulness by the lack of a navigable entrance from the sea; the Wash is being filled up with the deposits of rivers and tides, and the one channel to Lynn (a flourishing port in the Middle Ages) is with difficulty kept open.

There are many rivers flowing into the English Channel, but they are so short as to be quite unimportant, unless they have navigable estuaries.

Find the two important harbours of the S. coast formed by such estuaries.

The most noticeable feature in connection with the rivers of the Weald are the gaps in the downs through which they flow: these have been widened by erosion from the original clefts cut by the rivers in the edges of the high chalk dome which long ago covered the region between the N. and S. Downs.

Notice the courses of the Wey, Medway, Stour, Ouse and Arun.

In Ireland is the longest river in the British Isles, the Shannon, with a course of more than 200 miles, and though navigation is not continuous, there are many small steamers (largely cattle-boats) plying over long stretches of it. Limerick is the port at the head of its estuary.

The other rivers are of little importance apart from their estuaries.

Find on the map the rivers at whose mouths stand Londonderry, Dublin, Wexford, Waterford and Cork (Queenstown).

Lakes.

The lakes of the British Isles are not of much importance. They are mostly too small and too remote to be useful as portions of a system of navigable waterways.

Where in Scotland is use made of a line of lakes for navigation purposes?

The largest is Lough Neagh in N.E. Ireland. The lakes (lochs) of Scotland, many of which are connected with the sea, and those of the Cumberland and Westmorland Lake District, together with a few in N. Wales, are attractive to tourists on account of the beauty of the surrounding scenery.

The Distance-Map.

You have seen above, in the section on maps, how you can find the distance from one point to another by referring to the scale of miles given on each map in the Atlas. But as maps of our country are drawn on so many different scales, it is important to have some general idea of distance that is independent of any scale, so that with a little practice you may be able to judge distance with some accuracy on hand-maps or wall-maps drawn on a scale that is unfamiliar. Examine the diagram: the straight line D.H.-E.-L.-L.B. (Duncansbay Head, Edinburgh, Liverpool and Lyme Bay) is divided into three equal parts, each roughly 190 miles long—total 570 miles.

Notice the longitude of this line.

The line G.-D.-L.-S. (Galway, Dublin, Liverpool and Saltfleet) is also divided into three equal parts of 130 miles each—total 390 miles.

In what latitude is this line?

On L.-S. is described a square with London at the S.E. corner and Newport at the S.W.

The two distances, then, that you have to remember are 190 and 130 miles: multiply them by three and you have respectively the length of the British Isles from N. to S. and the breadth from E. to W.



You must notice at the same time that these straight lines indicate distance in a bee-line, and if you are using them to calculate distance by road or railway, some addition will have to be made: this addition will depend upon the character of the country: *e.g.* the railway line from Galway to Dublin across the Central Plain of Ireland is not much longer than the line drawn on the diagram: but the railway route from Edinburgh to Wick (near Duncansby Head), winding among mountains and along the shores of Moray Firth, is very much more than 190 miles.

Use your Atlas to find the following places and, with the help of the diagram, judge by eye the distance between each pair:

Dublin and Londonderry.

London and Bristol.

Carlisle and Glasgow.

Dublin and Cork.

London and Edinburgh.

Reading and Portsmouth.

Liverpool and London.

London and Dover.

Liverpool and Leeds.

Hull and Bristol.

London and Brighton.

Compare your bee-line distances with the mileage given in "Bradshaw" on main lines of railways.

Can you now decide what addition you should make for a railway route in easy and in difficult country? Estimate it as a fraction of the bee-line distance.

How could you find the scale of any map of the British Isles?

How many miles are there, roughly, in a degree of longitude in the latitude of London?

Climate.

In order that you may get first of all a general idea of our climate, you must turn to your isothermal and rainfall maps.

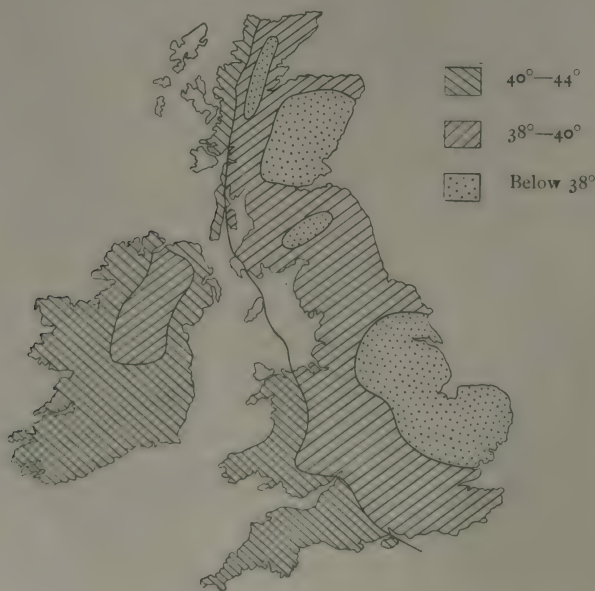
The important influences that affect our temperature and rainfall are our position on the windward coast of a continent (Europe-Asia combined) and a prevailing wind which reaches our shores from a large ocean. (Note that our prevailing wind is S.W. at all seasons.)

You will find in the map that our January temperature is higher and our July temperature is lower than in any country which is in the same latitude in the interior of the continent.

Again, taking into consideration both seasons of the year, the windward coasts are more plentifully supplied with rainfall than the interior.

You will thus observe that our range of temperature is moderate and our rainfall considerable and can therefore pronounce our climate to be of **the maritime type**.

But there are several points of detail to be examined.



Isotherms for January. (After A. Buchan.) Temperature in Deg. Fahr.



Isotherms for July. (After A. Buchan.) Temperature in Deg. Fahr.

Temperature.

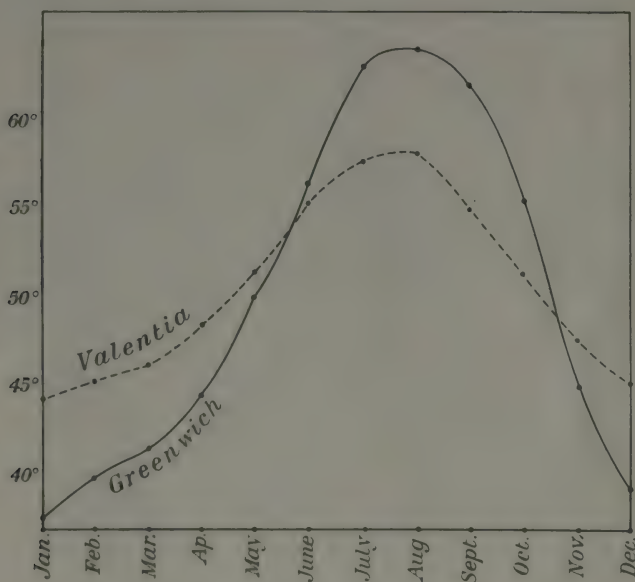
Consider first the January and July isotherm maps. Here you see that the regions with the highest temperature are not the same at both seasons: clearly, then, the source of warmth cannot lie in the same direction.

In January the S.W. winds, starting from warmer latitudes and blowing over an expanse of water which is slower than the land to lose its summer heat, bring much

warmth to our western districts: but as they pass on eastwards, they gradually acquire the temperature of the colder land over which they are blowing, and thus carry less warmth to the central and eastern districts. Study the temperature-curves for Valentia and Greenwich.

Secondly, there appears to be little difference between the temperatures of the N.W. coast of Scotland and the S. of Cornwall. Now what does your experience tell you of the power of the sun in our winter? Remember how small our range of latitude is, and then write down under the January map the conclusion you draw as to the respective value of the sun and the S.W. winds as sources of warmth in our winter.

Valentia is S.W. of Ireland
Greenwich is S.E. of Great Britain



No account is taken of height of land in these maps because all isotherms are constructed to refer to sea-level: but if you study the temperature curves of Ben Nevis and Fort William, you will be reminded that the highest regions will be actually the coldest even in the warmer western districts.

Why is it that the winds from N.E., E., or S.E., which we experience occasionally in winter and spring, are so cold?

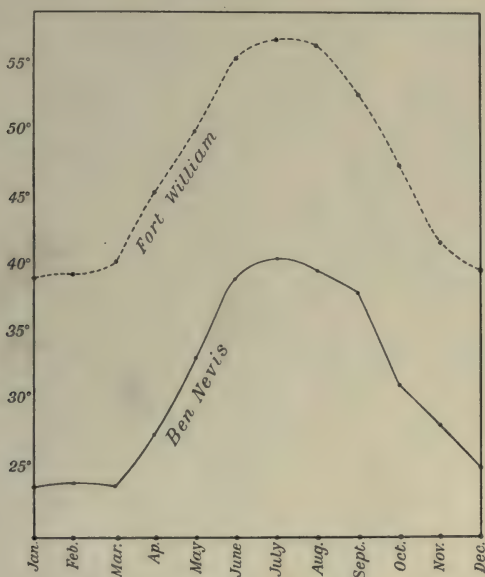
In July, one of our warmest months on the average, the greatest heat is felt about noon when the sun is due south. The source of warmth, then, lies to the south and from south to north the temperature varies roughly with the latitude. But we have still to reckon with the effect of the seas that surround us and the winds that blow from them. Our prevailing wind, blowing cool off the ocean, will

temper the heat of the sun in the W. and S.W. districts. [Refer to the temperature curves of Valentia and Greenwich.] Even furthest south, where it should be hottest, we find that Cornwall—on the windward coast—is much cooler than Cambridgeshire which is much further north, but inland.

Why do holiday-makers from our inland counties so often flock to the coast in summer?

Can you explain why there is a fringe of cool coast-land stretching along the south from Kent to Dorsetshire in summer?

Why does the isotherm 60° F. in the July map make that remarkable bend southwards in the sea between Ireland and Great Britain?



Ben Nevis is 4400 ft. above sea-level

Fort William is 50 ft. above sea-level, at the foot of the mountain

Rainfall.

Our average rainfall over the whole country is 36 inches and its character may be described as moderate. The important point is that it is fairly evenly distributed throughout the year. However, the amount that falls in different parts of the country is variable: working with the Atlas, fill in the blank spaces below:

Our highest land is nearer the coast than the .

Our prevailing winds are from the .

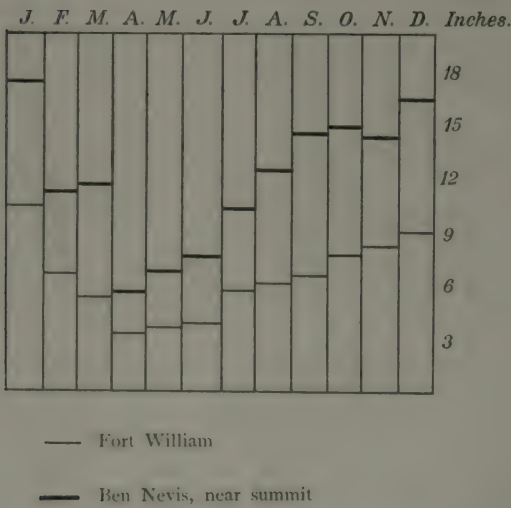
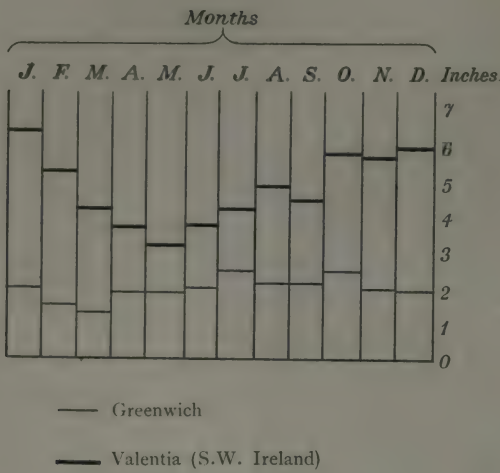
The half of the country will therefore be wetter than the half.

[Examine the rainfall diagram for Greenwich and Valentia.]

The higher parts of the wetter half have a rainfall than the lower.

[Examine the rainfall diagram for Ben Nevis and Fort William.]

Our maximum rainfall is found near the coast upon which the prevailing wind blows from the sea, and where the elevation is more than feet.



Our minimum rainfall occurs where the elevation is below feet, and so far away from the coast that the prevailing wind arrives dry. Our highest rainfall is more than inches a year, our lowest, less than inches.

Can you account for the dry regions round Dublin and the Moray Firth?

This diagram gives a summary of the points you ought to remember about our climate.



Resources: Agricultural and Mineral.

We are now ready to see how the surface-features and climate of our country affect the life of its inhabitants.

The number of people that any country can support depends largely upon its resources—agricultural or mineral. Now as food is man's first necessity, no country can afford to be entirely without agricultural resources of its own. Minerals may be of great value, but though useful minerals, like coal and iron, may foster large

manufacturing industries, and though precious minerals, like gold, may contribute much to a country's wealth, there is always in the case of mines some uncertainty as to how long they will last. Many a mining town has suddenly sprung up, prospered exceedingly, and then decayed only a few years after the minerals of the district have been exhausted. On the other hand, agricultural land, if it is treated carefully and if there is no serious change in climate, remains of permanent value as being always capable of production.

We shall see later whether in the case of our own country its agricultural or mineral resources are the more important.

A. **Agriculture** depends upon

- (1) climate,
- (2) the character of the surface-features,
- (3) the nature of the soil.

(1) You know already that certain conditions of heat and moisture are favourable to the growth of some plants and unfavourable to that of others. Further, some countries are entirely unproductive by reason of their climate: *e.g.* working with the Atlas, note how the character of the rainfall in the Sahara affects firstly the agricultural possibilities and consequently both the density of population and commercial development of that region.

(2) The highland parts of a country are the least productive: in the first place, there is no great depth of soil because heavy rainfall washes it down to lower levels, leaving much bare rock: and in any case the inequality of the surface makes the tilling of the soil difficult.

(3) Generally speaking, the most fertile districts are found in river valleys and lowland plains, where Nature (largely by means of streams) has deposited a mixture of soils which contain elements nourishing to plant life.

With regard to agricultural possibilities in the British Isles we can now note that, (1) as our country is small, our temperature of moderate range and our rainfall fairly evenly distributed, plants that grow at all in the British Isles can be grown almost anywhere, with few exceptions: (2) about a quarter of England and Ireland, a third of Wales and two-thirds of Scotland are composed of unproductive highland regions: (3) our most fertile soils occur in the lower-lying districts, particularly the central plain of Scotland, the E. and S. parts of England and the central plain of Ireland.

Of the forests that once covered much of the country, there are few remains: the New Forest, the Forest of Dean and Epping Forest are perhaps the most prominent.

Our principal grain crops are **oats**, **wheat**, and **barley** and there is enough sun to ripen all of them in most parts of the country: but oats are chiefly grown in the North and West (including Ireland), where the rainfall is considerable; wheat, chiefly in the clay soil of the East of England, from the Humber to the Thames, where the warm and dry summers assist the ripening and harvesting of the crop; barley will grow side by side with wheat, but being the hardiest of the three will grow well even in the extreme North of Scotland.

Roots, like potatoes and turnips, are the crops next in importance, and are grown largely in Ireland and the East of Great Britain.

Hops and fruits are grown mainly in the sunnier South (Kent—Hampshire) or West (from Worcestershire to Devonshire), but fruit-growing, with market-gardening, also occurs near all large centres of population.

The mild and damp winters of the West produce rich **pasture-lands** for cattle (Herefordshire), and sheep are raised on all of the lower hills: the quality of Scotch cloth (Tweeds), the excellence of Welsh and South Down mutton, and the woollen industries of the E. Pennines are probably familiar to you. Dairy-farming is important in the neighbourhood of large towns: *e.g.* in Cheshire, where the farmers find a ready and not distant market in the densely populated South Lancashire.

B. Minerals.

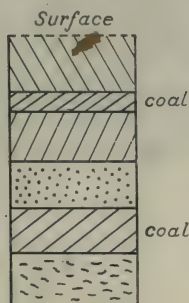
The development of manufacturing industries depends largely upon minerals. Of these, by far the most important is **coal**. Thousands of years ago large areas of the world's surface were covered with forests and other forms of vegetation.

These forest areas must have been submerged and then covered by deposits of material laid down in water: the decayed vegetable matter has lain for ages under the surface, all the time undergoing chemical changes and being hardened into coal by pressure from above¹. Peat is an instance of the early stage of the formation; the three later stages are represented by lignite, bituminous, and anthracite coal: progressing from peat to anthracite they grow harder and harder, take longer to kindle, and give out less smoke but greater heat.

Peat occurs extensively in the bog-lands of Ireland, where it is used for household fuel, but our coalfields produce either bituminous or anthracite coal: the former provides motive power for our factories and is also used for household purposes: the latter is particularly valuable to the Navy and Mercantile Marine as steam-coal.

Coal has been known to exist in our country for many centuries, but it is only during the last hundred years that it has been mined on a large scale: yet the increase of output in that period has been remarkable—from 10 million tons in 1800

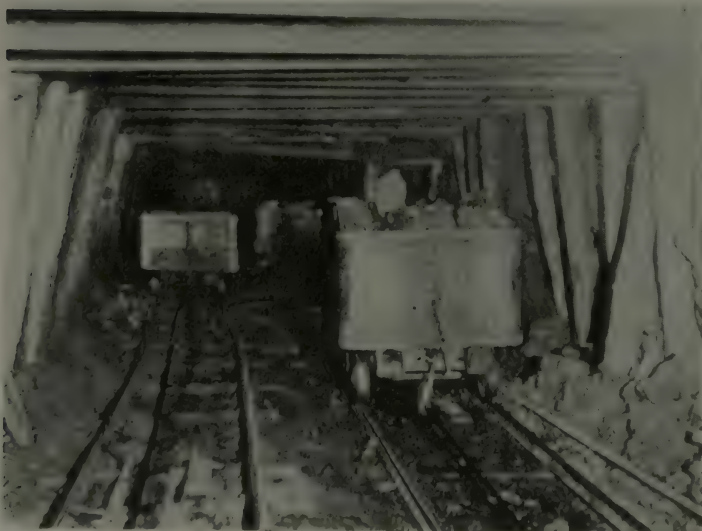
¹ Seams of coal are often found one above the other, separated by layers of various other rocks. In an earlier chapter (p. 6) you read about the continual rising and sinking of parts of the earth's surface; you will thus realize that between the periods of the formation of these seams there must have been a series of upheavals and submergences, each seam of coal representing a fresh growth of vegetation on the surface.



to more than 260 million tons in 1910. The chief result of this rapid growth in production has been to concentrate on the coalfields most of the big industries of



Coal mining: driving a stall



Coal mining: endless rope haulage

the country at the expense of many of the earlier industrial towns: *e.g.* the old woollen manufacture of Norwich has long since been removed to the Yorkshire coalfield.

Next in importance is **iron**, which is not only useful in itself as raw material for iron goods but is also necessary for the many varieties of manufacturing machinery. Though the quantity in our country is comparatively small, it is a fortunate circumstance that our iron is found side by side with the coal required for smelting it: for these two minerals are the first requirements of a manufacturing district.

There are, however, two other very important considerations—namely, the supply of raw material and the means of transport to and from the coalfield.

Almost every kind of manufactured article is made in the British Isles: the ideal arrangement would be that the raw material should be actually produced in the neighbourhood of the coal and iron: but though this is the case to a certain extent, the small size of our country and the character of its climate make it impossible to supply the coalfields with the necessary quantity and variety of raw material. This must reach the manufacturing districts from abroad and the more cheaply the better. In this respect the geographical position of the coalfields can greatly help or hinder the industries of a country; the cheapest form of transport is by water, and nearness to the sea or navigable waterways is of immense value to manufacturers whether they are importing raw material or exporting manufactured goods. Now let us examine the position of our chief coalfields. With the exception of the Midland coalfield round Birmingham—not the most important—none are very far from the sea. True, our rivers are not navigable for ships far from the mouth, but many are suitable further up for at any rate barge-traffic.

Find the big towns that have access to the sea by the rivers Tyne, Tees, Aire, Don, Trent, Thames, Avon (Somerset), Severn, Mersey.

Moreover, the nature of our surface-features makes railway construction easy nearly everywhere from the coast to the coalfields and also allows us to supplement our natural waterways by canals.

Find the Forth and Clyde Canal, the Leeds and Liverpool Canal, the Manchester Ship Canal, the Birmingham and the Thames and Severn Canals.

Apart from coal and iron our mineral resources are insignificant: **tin** and **copper** are produced in small quantities in Cornwall: Derbyshire contains **lead** and in N. Wales **slate** is extensively quarried: Cheshire, Worcestershire, and the Cleveland district of Yorkshire produce **salt**.

We can now consider the principal industrial occupations of the people of the United Kingdom.

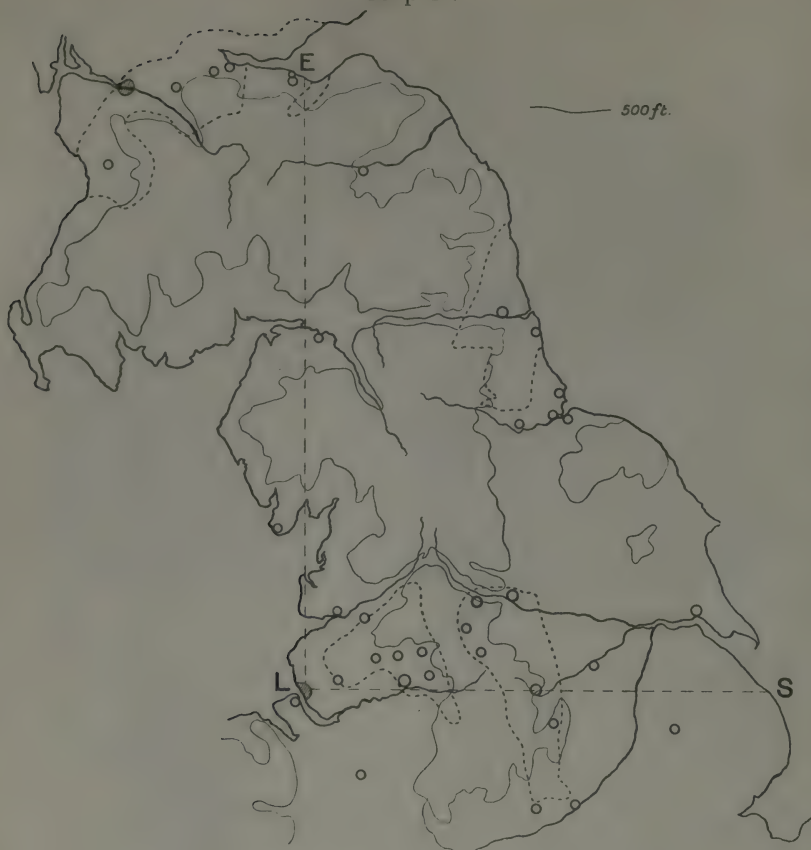
The coalfields will be the natural centres of industry, but we shall have to notice also some manufacturing towns not on coalfields which owe their particular industries to certain advantages of position or other circumstances.

In Map A below section with red pencil the land above 500 ft. Shade with black pencil the coalfields, which are shown by dotted lines.

The lines L.E. and L.S. (cf. p. 29) will give you an idea of distances on this map.

Mark with initials the names of the towns as you come to them.

Map A.



Scotland.

The Central Plain Coalfields (bituminous), stretching from sea to sea, contain the chief industrial towns, and their industries depend upon the raw material available. Much iron is found in the neighbourhood and, as is the case with all our coal-fields, still more is imported by sea, largely from Spain and Sweden. The chief smelting-towns are **Coatbridge** and its neighbours in the lower Clyde Valley, with **Kilmarnock** and **Falkirk**: they supply iron and steel for ship-building to the ports of the Firth of Forth, but far more to the Clyde estuary, the greatest ship-building centre in the world.

In a hundred years **Glasgow** has grown from a small town to the second largest city in the British Isles: it is the centre of a great industrial district: unlimited coal provides motive power for the factories: iron and steel supply the raw material for ships¹, marine and other engines, boilers, locomotives and machinery: the deepening

¹ Well known firms are those of Messrs John Brown and Co., W. Beardmore and Co., and Russell and Co.

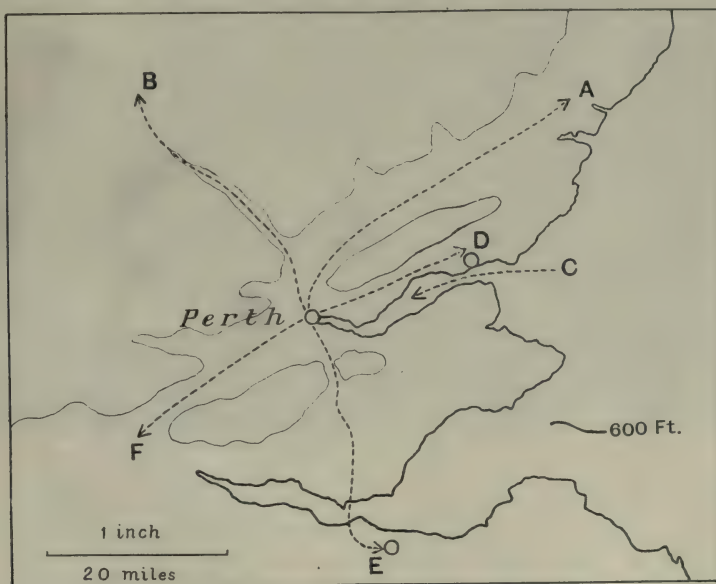
of the Clyde channel provides a navigable waterway along which raw material can be brought to the neighbourhood from outside: for instance, the great cotton-thread factories of Paisley depend upon the raw material imported chiefly from the U.S.A., and much of the wool woven in Glasgow and the neighbourhood comes from Australia or S. Africa.

Lastly, from these coalfields there is considerable export of coal; from the Clyde to Belfast, and from the Forth to the Baltic regions.

Of the other centres of industry we may notice the following: the basin of the Tweed with its pasture-lands has long been famous for a breed of sheep whose fine wool supplies the looms of **Galashiels** and neighbouring towns.

Find how far away the nearest coal-supply is.

On the Tay, **Perth**, which must always have been a place of importance on account of its position, has large dye-works.



Sketch-map showing Perth to be the natural meeting-place of important routes (road, river and railway)

Section with red pencil the land above 600 ft.

- A. To Aberdeen, passing N.W. of the Sidlaw Hills.
- B. Up the Tay valley to the heart of the Highlands and Inverness.
- C. The waterway approach, tidal to the head of the estuary.
- D. To Dundee, along the Carse of Gowrie.
- E. To Edinburgh, through the pass of Glenfarg and across the Forth, originally by ferry, now by the Forth Bridge.
- F. To Stirling, between the Ochills and the Highlands.

Draw a sketch-map of a similar nature to show how the position and surroundings of Stirling made it the "Key to the Highlands."

Dundee, standing on the seaward side of the Tay Bridge, is the port of the estuary. Jute (from India), hemp (from the Baltic) and linen (flax from the Baltic) are its most important manufactures and the fertile Carse of Gowrie (see Atlas) supplies fruit to its jam factories.

The largest town north of the Tay is Aberdeen, well known for its granite building-stone; it is also the most important of the fishing towns which stretch along the E. coast from Dundee to Wick.



Edinburgh Castle

Edinburgh, the capital, has large printing, distilling and brewing industries: the Castle Rock was very early the site of a fortress which commanded the E. coast road between the S. uplands and the sea: under the shelter of the castle grew up a town, which, as the historic capital, was certain to increase in importance: commercial enterprise has caused a still further expansion and now the city is practically continuous with the port of **Leith**.

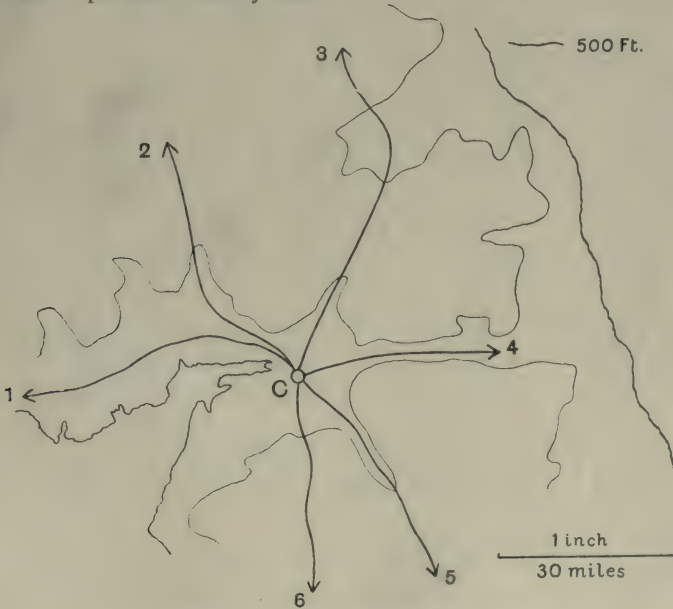
England and Wales.

The Northern Coalfield (bituminous) occupies the S. part of Northumberland and most of Durham. Much of the coal is exported to the E. parts of England south of the Humber, particularly London, and to the Baltic coasts. Apart from this the chief industries of the coalfield have been largely determined by the nearness of the Cleveland district of N. Yorkshire, which produces two-fifths of the iron ore in the country. Smelting is carried on in many of the towns and at **Middlesbrough** in particular. The most important industry is ship-building. Vessels

for the Navy are constructed on the Tyne (*e.g.* Sir W. Armstrong, Whitworth and Co., Elswick Works), and for the Mercantile Marine—from the largest liners down to colliers for the coasting traffic—at the Tyne ports (*e.g.* Messrs Swan, Hunter and Richardson), at **Sunderland**, **Hartlepool** and the ports of the Tees. At **Newcastle** there are important engineering works, and manufactures of heavy ordnance and of chemicals (the Cleveland district supplying the necessary salt). **Darlington** makes locomotives and railway material for the N.E. Railway.

On the opposite side of the country the chief industrial town is **Barrow-in-Furness**: there is a small coalfield on the Cumberland coast, and near **Ulverston** is the best iron ore in the country: the steel is extensively used for ship-building and the making of rails, girders for bridges and heavy ordnance (Messrs Vickers, Sons and Maxim).

The only other town of importance on the W. side is **Carlisle**: in earlier days it was a stronghold commanding the W. road into Scotland, with easy communications eastwards through the Tyne Gap: its position to-day makes it the meeting-place of many railway lines converging on the narrow coastal plain round the Solway Firth and thus it is an important railway centre.



Sketch-map showing position of Carlisle

Section with red pencil the land above 500 ft.

1. Glasgow and S. Western Railway, along the coast to Stranraer—for N. Ireland.
2. Caledonian Railway—to Glasgow, *via* the Annan and Clyde valleys.
3. North British Railway—to Edinburgh, *via* Liddesdale and Teviotdale.
4. To Newcastle, *via* Tyne Gap.
5. Midland Railway to Leeds, *via* Eden Valley.
6. L.N.W. Railway to Preston, over Shap Fells.

The Yorkshire Coalfield (bituminous) occupies much of the West Riding of Yorkshire and part of the counties of Derby and Nottingham.

The main industry is the making of textile goods. As early as Henry VII's reign Flemish weavers had settled in this district, where the pastures of the Yorkshire and Lincolnshire hills provided them with wool of good quality and there was an ample supply of pure water for washing and cleansing the wool. But within the last hundred years an extraordinary development has taken place, due firstly to the introduction of machinery and secondly to the excellent means of transport to and from the coalfield.

The great woollen market of the district is Leeds, which distributes to the manufacturing towns around the raw material which it receives from abroad, through London, Hull or Liverpool. It is connected with these ports by a good system of railways, by canals and (in the case of Hull) by a navigable river. From the same wide area it collects the manufactured goods ready to be sent to all parts of the country and abroad. Each of the manufacturing towns specialises in some particular class of woollen goods, and the chief are Bradford, Halifax and Huddersfield. At Nottingham on the Trent, at the S.E. corner of the coalfield, cotton hosiery and lace are made, and silk goods are manufactured at Derby and Chesterfield.

Further, a supply of iron, either found in the neighbourhood or imported from abroad, has added other important industries: Leeds is the chief smelting-town and, together with others, makes the machinery for the whole textile industry. Sheffield, with its supply of water-power and quarries of millstone-grit for grind-stones, early established a reputation for cutlery: the best steel is now obtained from Sweden, being brought up the navigable Don: the manufactures of Sheffield also include steel rails, armour-plate and machinery.

Derby and **Doncaster** make locomotives and railway material, and farther afield, at **Lincoln** and **Grantham**, agricultural implements are made on a large scale. The chief eastern outlet of the whole district is **Hull**, a deep-water port facing N. Europe.

Find how far it is from Hull to Leeds in a bee-line.

Why has Hull taken the place of Goole as the chief port of the Humber?

The Lancashire Coalfield (bituminous).

On the W. side of the Pennines also textile manufactures provide the chief occupation of the people, but the earlier woollen manufactures of Lancashire have given way almost entirely to cotton, for which the moister climate of the windward side of the hills is peculiarly adapted. The general circumstances of the cotton industry are very like those of the woollen: Manchester, though not so much a manufacturing city, is, like Leeds, the great market-centre for distributing raw cotton to the district and collecting the manufactured goods: there are a large number of manufacturing towns (**Oldham**, **Bolton**, **Blackburn**, **Preston**, **Bury**, **Rochdale**, etc.) each specialising in a certain class of cotton goods, and many of them making (with imported iron) the machinery for the factories: and finally, there is the Mersey

estuary—the equivalent of the Humber. Here **Liverpool**, with its six consecutive miles of docks on the N. bank, and **Birkenhead** on the S. bank form the sea-gateway to the whole district, and in addition possess large engineering works and ship-building yards (*e.g.* Messrs Cammell, Laird and Co.). The largest vessels can enter the river at any time, though the bar at the mouth of the estuary requires constant dredging. We have mentioned before the Liverpool and Leeds Canal, and this and the Manchester Ship Canal (opened in 1894) provide a means of transport additional to and cheaper than the excellent system of railways which connect the coalfield with the coast.

Much of the imported raw material is now brought in ocean-going vessels straight to Manchester, which in value of exports and imports is now the fourth port in the kingdom. Two-thirds of the imported cotton comes from the United States of America; Egypt is the second largest source of supply, and India the third.

Of the other industrial towns on the coalfield, **St Helens**, with a supply of salt near in Cheshire, has important chemical manufactures, and **Crewe** makes locomotives and other railway plant for the L.N.W. Railway Co.

Draw a sketch-map of Crewe to show how its position in the Midland Gap has made it a great railway junction.

Map B.

Section with red pencil the land above 500 ft.
Shade in the coalfields.



The line L.S. is a guide to distance on this map.

The Midland Coalfields (bituminous), in the counties of Stafford, Warwick, Worcester and Leicester, are further from the sea and more scattered than those we have dealt with before, and the industries connected with them are rather more varied.

These originally depended on local resources: the neighbouring forests long ago supplied the charcoal wherewith to smelt the local iron: the pastures of Leicestershire, Northamptonshire, and counties adjoining, supplied wool of fine quality and skins for leather: and the potter's earth of the district round the source of the Trent has been worked for more than 100 years. The same industries still continue to flourish by reason of the local supply of coal, though the greater part of the raw material has to be imported.

To-day the industrial regions round **Stoke** and **Hanley** are called the "Potteries": local clay still supplies material for the rougher forms of pottery but china-clay for porcelain is imported, chiefly from the country between Plymouth and St Austell in Cornwall. **Worcester**, too, makes china.

In the "Black Country," **Birmingham** is the centre of a ring of towns (**Wolverhampton**, **Walsall**, **Dudley**, **Coventry**, etc.) all occupied in the working of metals: but being so far from the sea, this district specialises largely in articles of small size for the export of which sea-carriage is not essential, *e.g.* buttons, screws, nails, needles and pins, cycles, small engines, brass and bronze work, jewellery, small-arms, etc. At **Leicester** there is an important manufacture of woollen hosiery, and **Kidderminster** has carpet factories. **Northampton** is the chief centre of the boot-trade, and the breweries of **Burton**, lying in the midst of a good barley-growing district, owe much to certain qualities in the water of the Trent.

Though the district is far inland, the character of its surface-features enables it to communicate rapidly with the outside world by easily constructed canals and railways. The result is that Liverpool, Hull, Bristol and London all serve as ports of outlet and entry for this Midland region.

Find from the Atlas and mark in Map B the canals joining Birmingham with Bristol and Liverpool, and the "Potteries" with the Mersey estuary.

Show how the L.N.W. Railway from London to Liverpool and the Midland Railway from Bristol to Sheffield (and Hull) cross each other at Birmingham.

Find the distance from Birmingham to each of the four ports mentioned above.

The South Wales Coalfield (anthracite and bituminous).

This coalfield derives its chief value from the fact that it alone produces anthracite coal. The intense heat produced by this coal makes it invaluable as steam-coal and for smelting purposes. Hence, then, our Navy and Mercantile Marine get their supplies and about half of the output is exported to foreign countries.

The great industry throughout the coalfield is the smelting of ores and all the big towns are engaged in some form or other of it: **Merthyr Tydfil** specialises in iron; **Cardiff**, in iron and tin-plate; **Swansea** and **Llanelly**, in copper, zinc and tin-plate. Originally the iron was obtained from the neighbourhood, and Cornwall supplied copper and tin, but now nearly all the ores are imported—iron, chiefly from Spain: copper, from U.S.A. and Australia: tin, from the Malay Peninsula and neighbouring islands. All the large towns, except Merthyr Tydfil, are on or near

the sea, but the chief ports are **Newport** and **Cardiff** (including **Barry Docks**), through which pass most of the out-going coal and in-coming ores.

Not far distant to the east lie the smaller coalfields of the Forest of Dean and of Bristol. Dependent on these are the west of England cloth factories at **Stroud** (less important than formerly), **Trowbridge** and **Bradford-on-Avon**. The chief port of the district is **Bristol**, which for long was the second port in the kingdom and new docks for the larger vessels have recently been constructed at **Avonmouth**. Trading always with N. America and the W. Indies, Bristol still obtains from them and from S. America the raw material for its timber-yards, sugar refineries, leather, chocolate and tobacco factories.

Both here and at the S. Wales ports there is some ship-building, but the industry is small compared with that of the great centres in the North.

There are, in addition, other industrial towns scattered over the British Isles away from the coalfields, and even though some of them are supplied with raw material in the neighbourhood, all must import coal: the chief of them, therefore, will be on the sea-coast or on more or less navigable waterways.

London, for instance, drawing coal chiefly from the northern coalfield by sea, or by rail and canal from the Midlands, is our largest industrial city, though it does not manufacture any one class of goods in particular. Again, in Ireland, where the native coal supply is small, the only two manufacturing towns of importance are **Belfast** and **Dublin**—both on the E. coast and within easy reach by sea of the Scottish, Cumberland, and Lancashire coalfields. The chief industries at **Belfast** are ship-building (Messrs Harland and Wolff's yard has a world-wide reputation) and linen manufacture: large quantities of flax are grown in Ulster itself, but for ship-building the raw material is mainly imported: at the same time the little iron that is found in Ireland is mined in Antrim, quite near.

Dublin has always been the capital since the earliest times of connection with England. It lies in a break between the Mourne and Wicklow mountains where the coast is low, exactly opposite a similar gap on the English coast between the Pennine and Welsh mountains, where Chester, the usual port of departure for Ireland before the Dee estuary was silted up, has been supplanted by Liverpool and Holyhead. The chief industries in Dublin are brewing and distilling.

Again, far from coalfields are some of our naval ports, which occupy a large industrial population in building and repairing war-vessels or in manufacturing war material: **Portsmouth**, **Plymouth** and **Chatham**, guarding our S. coast from Land's End to the Thames, are great centres of industry as well as our chief naval harbours. **Southampton**, too, is rapidly growing into a great industrial city—a port of departure for English, and port of call for foreign liners going to America.

The smaller inland industrial towns are too numerous to be mentioned: *e.g.* many Scotch and Irish towns are occupied with brewing and distilling, and in England it is enough to suggest that local resources, such as hops in Kent, or wheat

in the Thames valley, often cause the expansion of towns like **Maidstone**, with its breweries, and **Reading** with its biscuit manufactures.

Fisheries.

Fishing has always provided a profitable occupation for our coast population. The amount of fish landed on our E. coasts (chiefly herring, cod and haddock) is about five times as much as that of all the other coasts together: thus the centres of the trade face the North Sea. **Billingsgate** (London) is the great market, and **Grimsby**, **Hull**, and **Aberdeen** are the largest fishing ports: there are others of considerable importance, like **Yarmouth**, **Lowestoft** and **Peterhead**, and many much smaller, but since the introduction of steam trawlers, the trade is being concentrated in a few large ports with good railway communications inland: these have grown at the expense of their smaller rivals, which have suffered in much the same way as the many small inland towns whose industries have been transferred to a coalfield. On the south coast, where mackerel is the chief catch, the main centres are **Newlyn** (near Penzance) and **Brixham**: the headquarters of the west coast fisheries (hake in particular) are **Milford** and **Fleetwood**. Besides the fish mentioned above, many other varieties are caught round our coasts and the value of fish landed in 1910 was nearly £12,000,000.

It is now time to take a short survey of our trade and decide whether our agricultural or mineral resources are the more important.

In the early days of our history, agriculture was the most important occupation of the people and all through the Middle Ages wool was the most important item of our foreign trade: indeed, even well into the 19th century we could supply ourselves with all the food we wanted. During this period the S. and E. were the wealthier parts of the country.

In the Wars of the Roses and in the Great Civil War, which side held London and the E., and which side won in each case?

But during the last century a great change has taken place: since the introduction of steam-driven machinery, the real value of our coal and iron mines has been learnt and our manufactures have increased enormously—at the expense of our agriculture. Moreover, the development of the vast wheat-fields and ranching lands in newer countries (e.g. U.S.A., Canada, and Argentina) and the import of their products into our country free of tax, have made it hard for British farmers to compete on equal terms with their foreign rivals. As a result large areas of the land have gone out of cultivation and many of the country people have either emigrated or drifted into the manufacturing towns to find work. The greater wealth of the country has meanwhile moved N. and W. to the industrial districts.

Thus our output of agricultural products has fallen off so much and at the same time our population has increased so fast, that we have to import $\frac{3}{4}$ of our food, and if these foreign supplies were stopped, we should be on the verge of starvation at the end of a single month. Coal, on the other hand, our most important

mineral, is the one commodity that we do not have to import. Finally, our minerals are not only valuable in themselves but also provide work for a large majority of the people: whereas agriculture, in the nature of things, employs comparatively few workers and the output grows smaller year by year.

We are still, however, the chief sea-carriers of the world and it is upon this business, and upon our export trade in manufactured goods and coal that we depend as a nation for our chief wealth, and in connection with both our export and import trade it should be noted that the various portions of the Empire are yearly becoming more important to us as producers of our imports and consumers of our exports.

Population.

The majority of people in our country have to work in order to live. Fortunately our climate is such as to allow us to work all the year round even out-of-doors.

By contrast—(a) Is outdoor work possible in winter in the Labrador Peninsula? (Consult isothermal map.) How does the latitude of Labrador compare with ours?

(b) What is the meaning of the word "siesta"? In what countries is it a necessity? In what zone are those countries?

Now the number of people in any district will depend upon the amount and character of the work it can provide.

Consider first the regions of greatest elevation: *e.g.* the Scottish Highlands. Here the climate is not suited for comfortable habitation, nor is the soil productive enough to provide work.

Next take an agricultural district: can pasture-lands or crop-lands support the larger number of people? Ask yourself how many shepherds would be wanted for the care of stock grazing on a farm of 200 acres (not quite $\frac{1}{8}$ of a square mile): and how many labourers on a farm of the same size would find work in ploughing, sowing, reaping and harvesting crops!

Finally think of a manufacturing district, depending largely on its minerals: how many people do you think could be employed in factories which covered 200 acres? A careful examination of maps showing the distribution of the people will prove that the densest population is found on and around the coalfields: that the agricultural districts support a smaller but evenly distributed population, crop-lands more, pasture-lands less; and that the highest parts of the country are scarcely inhabited at all.

You can verify these statements by considering the reasons for the following:

1. Nearly a quarter of the population of the British Isles live within a radius of 50 miles of Manchester.
2. The total population in Ireland is about the same as that of Scotland: in one country two-thirds of the people are concentrated in one-third of the area, and in the other they are evenly distributed over all.
3. Between the densely populated districts of the Lancashire and Yorkshire coalfields, there is a large district practically uninhabited.

According to the census of 1911 our total population was in round figures $45\frac{1}{4}$ millions, divided as follows:

England	34	millions.
Wales	2	"
Scotland	$4\frac{3}{4}$	"
Ireland	$4\frac{1}{2}$	"

The number of people per square mile over the whole country is about 380.

The following figures for the principal towns will be useful for reference: the towns are arranged according to size and the figures in brackets represent thousands:

Million		Million	
$7\frac{1}{4}$	London (including outer ring of suburbs within the Metropolitan Police District).		Bradford (288)
	(Glasgow (780)		Hull (278)
$\frac{3}{4}$	{ Liverpool (746)	$\frac{1}{4}$	{ Newcastle (266)
	{ Manchester (714)		{ Nottingham (259)
	{ Birmingham (525)		{ Stoke (234)
$\frac{1}{2}$	{ Sheffield (454)		{ Portsmouth (231)
	{ Leeds (445)		{ Salford (231)
	{ Belfast (385)		{ Leicester (227)
$\frac{1}{3}$	{ Bristol (357)	$\frac{1}{5}$	{ Plymouth (193)
	{ Edinburgh (320)		{ Cardiff (182)
	{ Dublin (309)		{ Bolton (180)

In addition there are 21 other towns in England and Wales with more than 100,000 people, two in Scotland—Dundee (165) and Aberdeen (163)—but none in Ireland.

Origin and Growth of Towns.

The reasons which help to account for the origin of our towns have varied widely in the different periods of our history.

We can imagine the early inhabitants forming their settlements in river-valleys which they could enter from the sea, *e.g.* Thames or Ouse, and where they found a good water-supply and a clay soil which was useful for their rough pottery as well as for the more important purpose of cultivating wheat. But before long there would arise a need to unite for purposes of defence particularly: and here geographical considerations were important. A position high above the level of the neighbourhood and partly or wholly surrounded by water offered the best natural site for a stronghold: *e.g.* the Castle Rock at Stirling, or the gravel mound on which Ely stood up above the fen-lands—where Hereward the Wake made his last stand. All through the early part of our history the building of fortresses continued, like those of the Romans at Chester and York, or those of the powerful barons of Norman times: under the shadow of their protection many of our old towns grew up, such as Warwick and Alnwick.

Later, in more peaceful times, traders began to move freely about the country and their roads would naturally lie along the easiest routes, crossing rivers where there was a ford (or later, a bridge) or passing through a gap in the hills rather than over the higher parts. At points where the surface-features offered such opportunities, halting-places would be established and here gradually all the routes of the neighbourhood would tend to meet, so that important markets would be created, where traders arriving by the different roads could exchange their goods¹. Consider, for instance, the position of Canterbury, situated at one end of a gap in the N. Downs and where a bridge enabled the road from Dover to London to cross the river Stour: or look at the sketch-map of Guildford, which shows how it grew



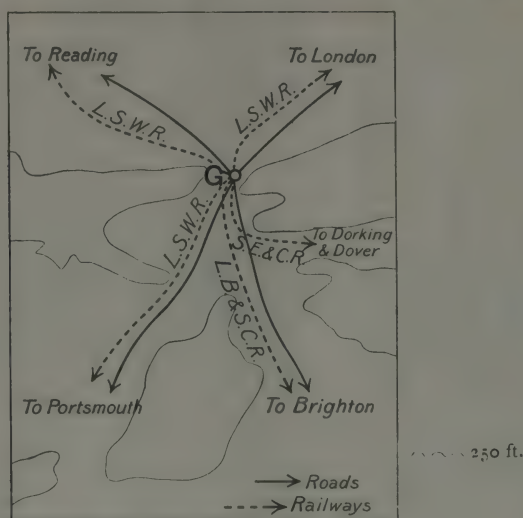
Alnwick Castle

to be a market-town as the place where roads from different directions met. Or examine the position of Reading and Tewkesbury, where waterways meet, and finally think of the number of our old towns whose names end with "bridge" or "ford."

With the rise of manufactures, men were attracted to districts possessing supplies of motive-power and raw material: at first, towns sprang up where water-power could be used to turn mill-wheels and drive machinery, as at Sheffield and other towns on the Pennine slopes; or where iron was found in the neighbourhood of forests which could provide charcoal for smelting, as in the Midland district of the Forest of Arden. And later, since coal has been used extensively to produce

¹ Note, too, as illustrating how surface-features affect modern as well as ancient routes, what use is made of the gap by railways of to-day.

motive-power, the steady stream of people to the coalfields has brought into existence a large number of industrial towns. Then again, both in early and later times, as travellers and merchandise were constantly entering and leaving the country, there arose the necessity for ports, and they would grow in importance in proportion as they had safe anchorage, or were conveniently situated for trade with particular countries: *e.g.* Hull, for trade with the Baltic; London, with the neighbouring coasts of Flanders and France; Bristol and Liverpool, with the New World which they directly faced. Under this heading come also the smaller coast-towns which have developed into ports since traffic across the Channel has become more general—in addition to Dover find Harwich, Queenborough, Folkestone, and Newhaven.



Sketch-map showing position of Guildford.
Section with red pencil the land above 250 ft.

Other towns, again, have sprung up to meet the requirements of invalids or pleasure-seekers: Bath, with its natural waters, was a favourite resort of the Romans, and Harrogate, Matlock, Tunbridge Wells and others have grown round their mineral springs. Pleasure-towns are most numerous in the neighbourhood of crowded industrial regions, *e.g.* Brighton, Margate, and many others on the S.E. coast near London; Blackpool, near the Lancashire coalfield; or Scarborough, on the Yorkshire coast.

We see, then, that towns originate on account of special attractions in the way of natural position or resources of some kind or other; but their later growth depends on whether they retain those attractions or can find some substitute for them if they disappear. Take the case of some of our once important harbours: the geographical position of Chester and Falmouth remains what it was: but Chester has decayed, partly because Nature has blocked the Dee estuary with sand, and partly because it has been overshadowed by Liverpool which is more conveniently situated as the port of the Lancashire coalfield. Falmouth, too, has been supplanted by Plymouth as a naval harbour, and has failed to develop commercially because

there is no region behind it which can provide it with the business of importing raw material or of exporting agricultural products or manufactured goods. In other cases, thanks to modern engineering improvements, which lessen the cost of transport, towns whose local resources have been exhausted, can still obtain raw material cheaply from a distance, and thus retain their population of skilled workers who would otherwise drift elsewhere.

Now examine carefully the sketch-maps which illustrate the origin and growth of **London**.

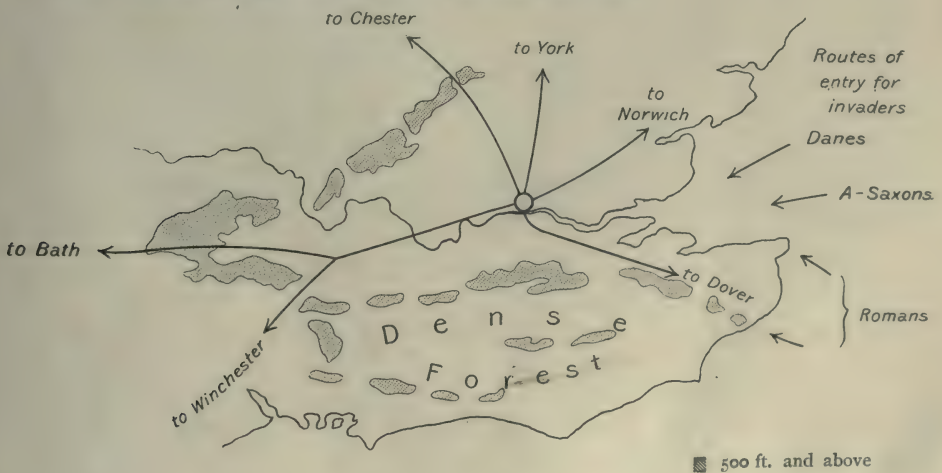
1. Earliest London.



Note the following features:

- (a) The flat lands, through which the river wound its way, were mostly swamps or densely wooded.
- (b) Between the Fleet and Walbrook was higher ground rising steeply from the river up to 50 feet: here was built an early British fort, protecting a settlement of pile-dwellings grouped near the mouth of the Fleet.
- (c) This was the first point up the river where it was possible to cross at a ford, and paths led to it from north and south.
- (d) But on account of the marshes and forests the river was the chief highway to and from the settlement.

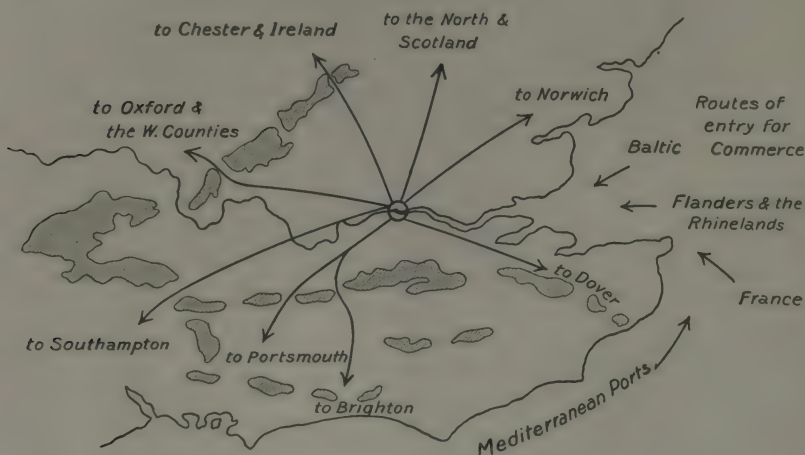
2. The Roman, Anglo-Saxon and Danish periods.



(a) The British hill-fort has become a Roman fortress, and a bridge (probably) takes the place of the old ford.

(b) The city is at the head of the estuary, where sea and river navigation meet and whence roads radiate out into the country in all directions.

3. The Middle Ages and up to the end of the 18th century.



(a) The first London Bridge was built in 1170.

(b) The marshes are drained, the forests cut down and the river confined to its channel by embankments.

(c) The walls are built nearly on the site of the Roman fortress—the Tower of London was begun by William the Conqueror.

(d) More roads than before lead out into the country, but the river is still an important highway.

(e) With its easy water-approach from the North Sea, the city becomes the chief market of continental imports and English exports, largely wool. Foreign merchants are allowed to settle (Lombard Street, Old Jewry), and as the political capital and commercial centre, the city continues its growth unchecked, except for a brief period when it was recovering from the Plague and the Great Fire, 1666.

4. Modern London.

(a) The market of the Continent has become the market of the whole world, with a vast trade in imports particularly.

(b) The sea-entrance is still important enough to make her one of the greatest of all ports.

(c) She has also become the largest manufacturing city in the kingdom dependent upon imported raw material and coal brought cheaply by sea from the northern coalfield.

(d) Railways have replaced the old roads and the quicker means of transport has kept London still the chief commercial centre in spite of northern rivals.



London from the Tower Bridge

Lines of Communication.

The construction of roads, railways and canals in any country is made easy or difficult by the nature of the surface-features. The chief difficulties are presented by mountains, wide rivers, and swamps. We have already remarked that in our islands the surface-features are but rarely a serious hindrance, and even where Nature

does offer obstructions, she also provides for us a means of avoiding the worst difficulties:

Comparing the physical and railway maps of Great Britain, find how the surface-features helped the builders of

1. *the Highland Railway from Perth to Inverness,* 2. *the line from Carlisle to Newcastle,* 3. *the line from London to Bristol.*

Moreover, the great advance in engineering science has made our natural difficulties still less formidable: as early as 1829 the draining of the swamp known as Chat Moss made it possible to build the first railway between Liverpool and Manchester, and since then the bridging of wide estuaries like the Tay and Forth, and the tunnelling of the Mersey, Severn and Thames, have been accomplished with comparative ease.

Lastly, observe that the influence of surface-features on lines of communication is shown equally in all periods—early, mediaeval, and modern times; the same instinct for the line of least resistance inspired our forefathers to make their roads, and modern engineers to build their railways, along river valleys or through gaps in the hills or by any other route that offered the easiest gradients and the lowest cost of construction.

From the Atlas find how the surface-features have guided the routes of travel between the following:

Taunton and Plymouth.

London and Portsmouth.

Carlisle and Leeds.

Reading and Worcester.

Chatham and Maidstone.

London and Brighton.

Newcastle and Edinburgh.

CANADA.

The Dominion of Canada includes all the northern half of the continent except Newfoundland (with Labrador) and Alaska. In area it is about as large as Europe (cf. p. 24) and the greater part of it lies in the Temperate Zone: the far northern parts inside the Arctic Circle, being uninhabitable, will require little of our attention.

How many times larger than the British Isles is Canada?

What are the lowest and highest latitudes that Canada touches, and how do they compare with the latitude limits of the British Isles?

If you examine the coast-line you find that the E. and still more the W. coasts recall the fiords of the W. coasts of the British Isles. These coasts, then, should provide good harbours, but before you can decide on the merits of the Canadian ports, you must examine a particular feature of this region.

In the Atlas trace the course of isotherm 32° F. in January, and find the Labrador Current. What is the only part of the Canadian coast where the temperature in January is above freezing-point? Will the Labrador Current raise or lower the temperature of the E. coast?

You have now found that most of the ports will be blocked by ice during a part of the year. On the E. coast, all the large ports except Halifax and St John

(N.B.) are closed regularly for five months: along the N. coast, navigation is interrupted for seven months every year.

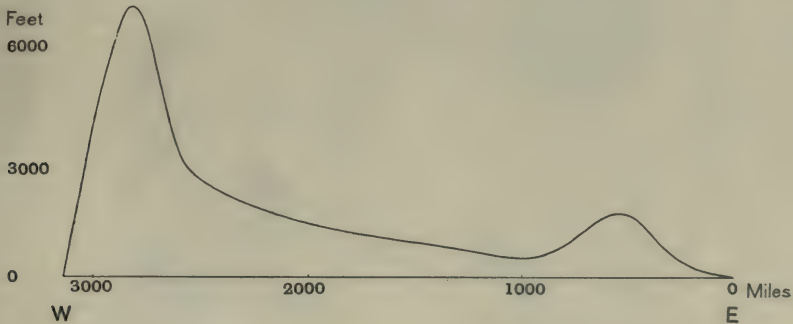
Can you suggest why this disadvantage is more seriously felt by the E. than the N. ports?

How has the position of the E. ports in connection with the rest of the world made them hitherto more important than those on the west, though the latter are not handicapped by ice?

Surface-Features.

A. Mountains, hills and plains.

The surface-features of Canada fall into three simple divisions from east to west—the Eastern Lowlands and Plateau, the Central Plain, and the Western Mountains. As the character of each division is uniform from N. to S., you will get a general idea of the lie of the land by imagining yourself travelling from E. to W. of the continent along parallel 50° N. Entering by the Gulf of St Lawrence, you



cross the lowlands west of the estuary and climb up into the hilly country of the Eastern Plateau. At the highest point you may be 3000 ft. (cf. Snowdon) above sea-level, and from here you descend gradually into the Central Plain, a great stretch of rolling country extending for more than 1000 miles westwards. The greatest height you will attain between the E. and W. mountains is 1500 ft. and the whole region slopes away northwards towards Hudson Bay. Then begins the long journey of 700 or 800 miles across the western mountain region: at first the ascent is gradual through the foothills, and then more abrupt up to the crest of the main range of the Rockies, in places 12,000 ft. high. [Note that the greatest height in the W. mountains—Mt McKinley, 20,000 ft.—lies far to the north in Alaska.] The western slope is still steeper than the eastern and the rapid descent to the Pacific shore takes you through mountain scenery which is as magnificent in its ruggedness as any in the world.

The section represents quite roughly the contour of the land from east to west in any latitude between 50° and 60° N.

B. Rivers and Lakes.

[Look up the names of the lakes and the courses of the rivers.]

A careful study of the map shows you that Canada is well supplied with rivers. As you would expect in a country so immense, the rivers are on a large scale and no country in the world has larger areas of inland water. The Great Lakes together are as large as Great Britain, and Superior by itself is equal in size to Ireland. But from the point of view of usefulness some of these waterways, in spite of their size, are of little value as highways of transport, and even the best of them are to some extent handicapped in the same way as the E. coast ports.

The rivers flowing northwards, like the Mackenzie or Yukon, are ice-bound for many months in the year and have their outlets in a frozen sea, and the lakes in



Niagara Falls in winter

the north-west suffer from the same disadvantage. The largest western river, the Fraser, with its source high up in the Rockies, is too rapid to be easily navigable for more than a few miles from its mouth. It is, then, the eastward flowing rivers and the Great Lakes that are most useful, but even in their case the severity of the winter robs them of much of their value: the rivers are frozen from bank to bank and though the Great Lakes are never frozen over completely, the ice round the shores makes it impossible to enter or leave the ports. Of the rivers flowing east from the Rockies, the Saskatchewan is the most important and with its tributaries provides 1200 miles of navigation from its mouth in Lake Winnipeg. But the most important waterway in the country is provided by the St Lawrence River and the Great Lakes. Rising west of Lake Superior, the river under different names flows through all the lakes except Michigan and only becomes the St Lawrence after

leaving Lake Ontario. Though the estuary is to some extent obstructed by sand-banks formed by the deposit brought down by the many tributaries which join the river between Lake Ontario and the sea, the Great Lakes act as filters of the streams which flow into them, so that the river leaves Lake Ontario as a clear stream. Moreover the enormous area of these lakes maintains a steady water-level in the river and prevents bad floods. Since the channel has been deepened, large ocean vessels can reach Montreal: thence by river and lakes (and occasional canals) there is continuous navigation up to the far end of Lake Superior—a distance of 2000 miles from the sea and nearly half-way across the continent in a straight line from Halifax to Vancouver.

The Ice-Age in Canada.

Since the continent assumed more or less its present shape, the northern part has experienced an ice-age. Great glaciers moved down from the north, covering practically the whole of Canada and a part of the United States as far south as the latitude of St Louis. These sheets of ice had a far-reaching effect upon the surface of the country. In the first place, they grooved more widely and deeply river valleys and depressions that already existed, and so were responsible for the hollows which to-day contain the Great Lakes and many others. Secondly, by blocking water-courses with ice or with the material they brought down, they diverted streams into unnatural courses and thus occasioned waterfalls or rapids: *e.g.* the barrier of deposit thrown across the river between Lakes Erie and Ontario gave rise to the falls of Niagara. And lastly, the mixture of soils brought down by the glaciers and spread over the Central Plain formed the fertile soil of the rich wheat-growing provinces of Manitoba and Saskatchewan.

Climate.

We described the climate of the British Isles as “maritime,” with a moderate range of temperature and considerable rainfall.

The important influences in our country—latitude, and the prevailing winds—are equally important in Canada. Now the latitude of the S. half of Canada (except in the east) is nearly the same as that of the British Isles and the prevailing winds are the same. But, when comparing the two countries, there is this great difference to be taken into account: the British Isles are small islands on the windward edge of a continent: Canada is a continent in herself. Thus her temperature and rainfall will be affected by the following features:

(a) her range of latitude is twice that of ours;

(b) her breadth from E. to W. is many times that of our islands;

and apart from her size, the W. mountains, on account of their height and extent, will influence the climate of the leeward regions far more than in our country.

What region in Canada has a climate most like that of our own country?

A. Temperature.

Using the isothermal map write down the January and July temperature figures as nearly as you can for the following places, first noting their exact position; observe that they are roughly in the same latitude:

	<i>Vancouver City</i>	<i>Winnipeg</i>	<i>Quebec</i>
<i>January</i>	° F.	° F.	° F.
<i>July</i>	° F.	° F.	° F.

You should find that the range in the west is about 25° F.; in the centre, about 70° F.; and in the east, about 55° F.

In winter, the W. regions are warmest on account of the prevailing winds off the Pacific; but since these grow colder as they blow eastwards over the land, the centre is intensely cold and in the far north there is a frozen desert: the E. regions, being furthest from the windward coast, would be coldest but for the influence of the Atlantic Ocean. However, on account of the cold Labrador Current this influence is comparatively small, and so the eastern parts are only slightly less cold than the centre.

In summer, the W. coasts are cooled by the prevailing sea-winds: but these lose their effect in the centre because the land is greatly heated and also sheltered by the great mountain wall of the Rockies: the east should be hottest but the influence of the sea is so far felt in the coast regions that they are no hotter than the centre.

We may conclude, then, that the range of temperature in the W. is of the "maritime" type, like that of the British Isles; in the centre, it is extreme and therefore of the "continental" type, while in the east it is something between the two.

Apart from a wide range of temperature over the year, the central regions are liable to astonishingly sudden changes within a few hours. The main cause is the absence of any protecting barrier of high land stretching across the country to the north or south of the great central plain of the continent. The result is that cold winds from the arctic regions or warm winds from the south can penetrate unhindered into the interior, causing a sudden fall or rise of as much as 30° F.

At what seasons of the year do these sudden changes most often occur?

B. Rainfall.

Remembering that the prevailing winds and the height of the land chiefly determine the rainfall, you must note the following points:

The Western regions, with their prevailing sea-winds and tremendous height of land, have considerable rainfall throughout the year.

The Eastern regions, with their occasional winds off the sea also have rain both in summer and winter.

In the Central regions you would expect little rainfall at any time during the year and this is true in winter, when the rain-bearing winds from the western sea reach the centre dry after passing over the mountains. But why does the rainfall map show rainfall in the summer? Now mark an important fact which is new to you: the centre is in summer extremely hot and the air over it is light, so that the heavier air from the cooler oceans on the N. and E. pushes its way inland carrying much moisture. Thus the centre has more rainfall than you would expect considering the distance from the coasts.

Bear in mind this comparison of Canada's rainfall with our own :

W. regions have **more than** the British Isles (chiefly because the mountains are higher).

Central regions have **less than** the average of the British Isles (with least under the lee of the Rockies).

E. regions have **the same as** the average of the British Isles.

N.B. Much of the moisture falls in the shape of snow : 10" of snow = 1" of rain, but the slow melting of the snow keeps the moisture longer in the ground, and the warm covering it affords to the surface prevents seeds and plants from losing their vitality in the long winter.

Development of the Country.

✓ We can now consider how far the surface-features have helped or hindered the opening up of the country. When the earliest European settlers entered the continent from the east, they established themselves at first in the coastal districts: *e.g.* the English in Virginia, the Dutch at New Amsterdam (now New York), and the French in Canada. The next step in expansion would be an advance into the interior, but to this the Appalachian mountains, which run parallel to the coast for hundreds of miles, would be a serious obstacle. If you look at the map you will see that in the United States there is only one break in this mountain barrier which admits of a passage from the coast to the interior at an elevation of not more than 600 ft., *i.e.* from Albany on the Hudson river to Buffalo on Lake Erie, by way of the Mohawk Valley. But in Canada, from the earliest times the estuary of the St Lawrence invited advance inland and the River and Great Lakes offered a natural route through the mountains, which was all the more enticing because it involved at first no clearing of forests nor making of roads. Once the Great Plains were reached, the development of the country became only a question of time. Much valuable pioneer work was done by the Hudson's Bay Company which established trading stations far and wide, and the fertility and level nature of the country soon attracted agricultural settlers. In the far west, British Columbia—first settled in the opening quarter of last century—remained cut off by the mountains from the rest of Canada till the "seventies," when it claimed admission to the Dominion.

Of recent years the rapid advance in development is largely due to the creation of the great railway systems and the improvement of the waterways. Here again Canada owes much to Nature: for in the former case, railway construction in the east and centre is as easy as in any country in the world, and the only difficulties occur in the western mountains. Even here, the Kicking Horse, Crow's Nest, and other passes offer opportunities of avoiding the worst gradients. In the case of the waterways, the sections that require improvements form only a minute fraction of the whole magnificent water-route from the Atlantic to the west end of Lake Superior.

Distance.

Remember first, that Canada is so large that you must adopt a bigger unit of measurement than you used for the British Isles, and secondly, that the distances with which you are concerned only deal with the S. part of Canada from E. to W., because as yet the N. parts are little known.

Take Winnipeg as starting point: it is half-way between Vancouver and Montreal in a straight line, 1200 miles from each (*i.e.* rather more than twice the distance between Lyme Bay and Duncansbay Head). From Montreal to Halifax round the N. end of Fundy Bay is half that distance, *i.e.* 600 miles. The total distance, then, across the continent is about 3000 miles.

What is the distance in a bee-line from Montreal to the most southerly point in Canada, and from Winnipeg to Port Nelson?

Why is there more difference between bee-line distances and actual railway distances in the W. than the E. parts of Canada?

What is the latitude of the boundary of Canada and U.S.A. between Lake Superior and the W. coast? How far south of the British Isles is it?

Communications.**Railways and Water-routes.**

In a country where distances are so immense, the question of transport is of the utmost importance.

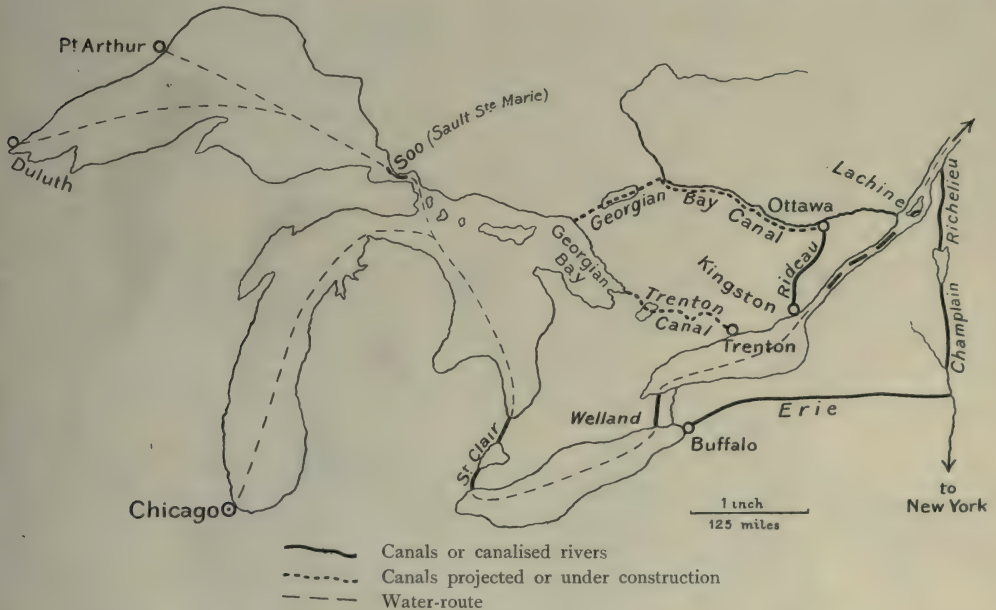
One of the most remarkable features in the recent history of Canada has been the rapid growth of the railway systems. Starting in the east, the builders of the Canadian Pacific, Grand Trunk and Canadian Northern Railways gradually felt their way westwards, and, buoyed up by their faith in the possibilities of the country, laid their lines through regions (at that time almost or quite uninhabited) where agricultural or mineral wealth had been proved or at any rate suspected. By the early "eighties" the Canadian Pacific transcontinental line, terminating at Vancouver City, had been completed and since then so many new lines have been built, including links with the United States, that the mileage has risen from 7000 to 25,000. Construction is still proceeding on a large scale and in a few years the Grand Trunk Pacific will provide an alternative through-route across the continent, with its western terminus at Prince Rupert. The value of the railways in opening up the country has been amply proved by successful settlement of the wheat and ranching lands of the central plains and the development of mineral districts round the Great Lakes and in the Rocky Mountains. It must be remembered, too, that, besides carrying all the traffic of the country in winter, the railways are necessary for bringing the interior in touch with the great water-routes.

Reference has already been made to the value of the Great Lakes and the St Lawrence River, and you will see from the sketch-map how these waterways have been made still more useful by the building of canals.

The largest vessels navigating the Great Lakes are of 13,000 tons. The depth of the connecting canals is (or shortly will be) 14 feet: between Lake Superior and

Montreal there is a fall of 600 feet (a large proportion of this occurs between Lakes Erie and Ontario, where the Niagara Falls alone account for 160 feet) and the number of locks that vessels must go through is 48.

The amount of traffic on the lakes is enormous: *e.g.* the freight passing through the Soo Canals (U.S.A. and Canadian) in a year is as much as enters London, Liverpool and Southampton together: the larger part at present is supplied by the United States whose people have equal rights of navigation (the boundary passes midway between the two shores of all the lakes except Michigan), but Canada's share is increasing rapidly. Moreover, the decision to make the Georgian Bay Canal and to complete the Trenton Canal shows how important it seems to Canadians to add to their waterways: by the former route the water journey



from Port Arthur to Montreal will be shortened by 300 miles, and much traffic from Duluth and Chicago, the chief U.S. outlets on Superior and Michigan, will probably use this route because there will be a saving of 800 miles as compared with the Erie Canal and New York route.

Resources.

We must now turn to the resources of the country. The point about Canada that cannot be emphasized too strongly is that it is a new country with a very small population. The early settlers had to provide themselves with the necessities of life and thus turned their attention first to agriculture. Now that the development of these resources produces not only a means of livelihood but also surplus wealth, the

men with capital are beginning to look in other directions as well. As a fuller use is made of the water-power and the coal available in the country, industries on a large scale are being started, and they will expand according as immigrants can be attracted and a market found at home or abroad for goods manufactured in Canada. But the country is still in an early agricultural stage: in fact, only the southern belt (a small fraction of the whole) of this fertile country is being used, and the large area of cultivable land awaiting settlers, together with the fact that the population is growing most quickly in the wheat lands, suggests that for many years to come agriculture will be the most important interest.

Yet the mineral wealth is very great, and though development in this direction has not proceeded far, the output of coal, iron, gold, copper, nickel and other minerals is increasing year by year.

As a great producing country, Canada is at present only beginning her career and her chief need is a larger population. [It is estimated that she could easily support thirty or forty times the present number of her inhabitants.] But though she is starting some centuries behind other countries, she has, besides vast agricultural and mineral resources, an immense advantage in the help of the improved mechanical appliances of modern times both for production and transport; consequently her growth will be the more rapid.



C.N.R. Elevators at Port Arthur (capacity 7,250,000 bushels)

Agriculture.

The chief crop is **Wheat** and it is grown in the Great Central plains, particularly in Manitoba and Saskatchewan under almost ideal conditions: these include firstly, a suitable climate, for there is enough rainfall and a long summer to ripen the grain; secondly, a surface easily cultivated and, on account of its level nature, well

adapted to the use of modern machinery, for the invention of which the American peoples are famous; and thirdly, a soil of such depth and fertility (remember the work of the glaciers), that at present any manuring process is unnecessary. And so the wheat-farmer starts with great advantages: furthermore, the land is cheap, for the Government gives to any genuine settler 160 acres on condition that he clears the ground and erects suitable buildings, and though labour is dear, his profits are high. Though wheat is a comparatively hardy plant, the severity of the climate is such that the chief danger is frost, which may damage the crop before it can be harvested: when harvested, the grain is stored in "elevators"—large buildings containing bins sometimes as large as 11 ft. square and 100 ft. deep—till it can be sent away to Canadian or foreign markets. These elevators are erected at convenient collecting centres, usually by the side of railways or navigable water. At present Canada retains two-thirds of the crop and the other third is exported, chiefly to countries of the Old World with dense populations.

Using the Atlas, trace out the routes of transport from Winnipeg, the great collecting centre:

A. In winter.

1. By rail to Port Arthur, Montreal, and then to St John or Portland.
2. By rail to Vancouver. This route, at present not much used, will be more important when the Panama Canal is opened in 1914 or 1915.

B. Before, or after, winter.

1. By rail as above.
2. By water from Port Arthur through the Great Lakes and Canals to Montreal, or, leaving Lake Erie at Buffalo, by the Erie Canal and Hudson River to New York. At Montreal and New York the grain is trans-shipped for the voyage across the Atlantic.

On examining these routes, you see at once the enormous value of the cheap means of transport by water; but the grain has to be brought by rail to the Great Lakes and in winter right to the coasts, and so large are the crops in a good year that the railways have more freight than they can possibly handle. Consequently, new routes of outlet are under consideration—the Georgian Bay Canal (sketch-map, p. 63), and the Hudson Bay railway from Winnipeg to Port Nelson or Port Churchill.

In what month is the wheat crop most liable to danger from frost?

Why will the export of grain from Canada probably increase and that from U.S.A. grow less?

Why should Canadian exporters send grain out of the country sometimes by Portland, which is in the U.S.A., rather than always by St John or Halifax?

[It is very difficult to describe in words how rapidly the production of wheat has grown, or to estimate the possibilities for the future. Consider for yourself the following facts and figures:

In 1901 Canada, with a population less than that of London, produced as much wheat as the British Isles.

By 1909 that amount had been trebled.



Cattle-ranching



General Orchard scene, Niagara Fruit Belt, Ontario

In 1910 Canada sent us $\frac{1}{3}$ of our imported wheat supply.

That quantity was $\frac{1}{3}$ of her output.

That output could be five times as great if she were using even $\frac{1}{4}$ of her available wheat lands.

The total quantity she could produce if the other three-quarters of the land were growing wheat, is almost incalculable.]

Of other crops great quantities of **oats** and **barley** are produced but they are consumed almost entirely in Canada, the latter being used largely to feed stock. The Eastern Provinces and British Columbia are more suitable for mixed farming: from Ontario to Nova Scotia **dairying** is an important industry and the export of cheese, butter and eggs is increasing rapidly. The chief **ranching** provinces are the above-mentioned and also Alberta: in the latter it is too dry for crops unless irrigation is used; but there is pasturage for horses and cattle and they can be wintered out-of-doors under the lee of the Rockies, because in most years local winds (Chinooks), warmed by compression in their descent from the Rockies, raise the temperature enough to prevent snow lying on the ground for more than a few days together.

The chief **fruit-growing** districts are the Ontario Peninsula, Nova Scotia and British Columbia, and there is a large export of apples, pears and peaches. All our English fruits flourish equally well, and in the Ontario Peninsula, where the climate is rendered milder by the surrounding water areas, even the vine is common.

Next to foodstuffs in point of value comes **Timber**. A belt of forest-land, as wide as the distance between the N. and S. limits of Scotland, stretches across the continent to the north of the wheat region from New Brunswick to British Columbia. In early days much timber was burnt in order to clear the land for crops: but since the world's supplies have shown signs of falling short, the forests of Canada have become of great value and a Government Department takes pains to prevent wasteful cutting and to replant areas where timber has been cut down. The most important varieties are spruce, pine and maple in the East, and spruce, cedar and fir in the West. All of these supply excellent timber to the saw-mills, which were established chiefly where water-power was available: in addition, from the maple (the leaf of which is the Canadian national emblem) sugar is extracted, and the spruce provides wood-pulp for paper-making and bark for tanning.

Winter is the great logging season: camps are formed in the woods, the trees are felled and drawn across the frozen snow to the banks of the nearest stream, down which, after the ice has broken up, they are floated to the junction with a larger river; here great rafts of logs are formed and then towed down to the first convenient milling town.

Furs and Fisheries.

The N.W. regions are peculiarly rich in fur-bearing animals—*e.g.* the fox, bear, sable, etc.—altogether fifty or sixty kinds. The Indians do most of the trapping in the remote forests and carry the skins in their birch-bark canoes down to the trading *dépôts* of the Hudson Bay Co.: the great collecting centre is Winnipeg because



Canadian timber-raft



Pulp-wood waiting shipment, Ontario

from there communication with the outside world is easiest. North of the fur country are the frozen tundras, only inhabited by small numbers of Eskimos.

There are important fisheries off E. and W. coasts: cod and herring particularly on the E. side, near the famous Newfoundland Banks; salmon in the W. rivers, white fish in the lakes, and seals and whales in the northern seas.

Minerals.

The mining industry is as yet in its infancy. Good coal is mined in Cape Breton Island, Nova Scotia, Vancouver Island and on the mainland opposite, but the output is not large. Situated near the coast on both sides, the mines supply coal for the shipping, for the towns of the coast districts and for those of the interior that can be reached by water. The central provinces get most of their coal from United States coalfields. Other minerals include—in order of value—**silver, nickel, gold and copper**. Nickel and copper are mined along the N. shores of Lakes Superior and Huron: silver and gold are found in British Columbia, Ontario and Nova Scotia, and the Yukon district also produces gold of the value of about £1,000,000 a year.

Industrial Occupations.

With a small population at present occupied chiefly with agriculture, and with insignificant and widely separated supplies of coal, Canada has not till recently paid much attention to manufacturing. But the future is full of promise, because the output of coal is increasing and the thousands of waterfalls distributed, unlike the coal, all over the country, can provide an enormous amount of motive-power, *i.e.* as much as could be produced by 500 million tons of coal per year; and of this possible supply only one-fiftieth is as yet developed.

The manufactures at present, therefore, do no more than supply a small part of the country's wants, and for many years to come most manufactured goods must be imported.

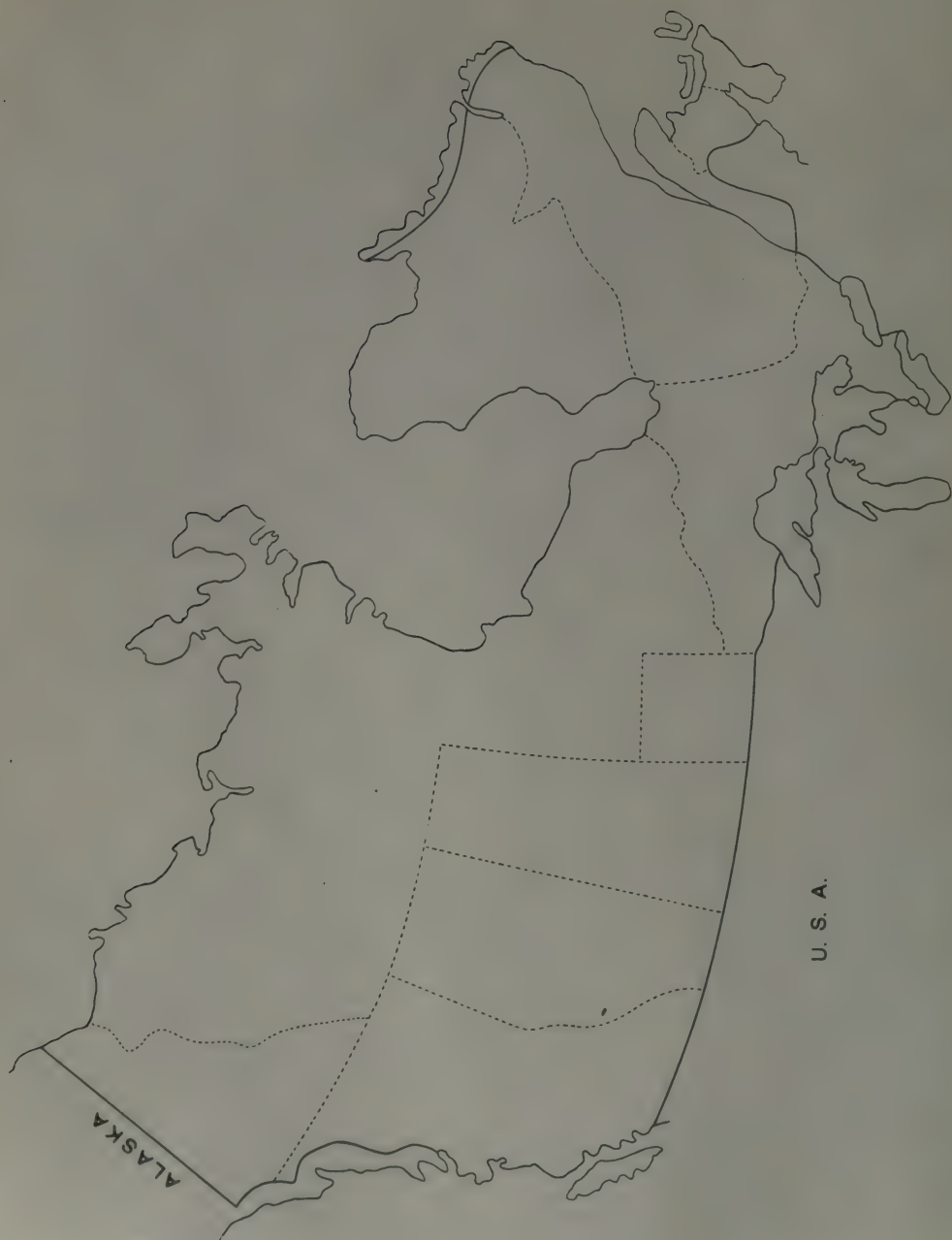
The chief manufacturing towns are referred to below; you will expect to find them where motive-power is readily obtainable and as near as possible to the areas which produce the raw material.

Insert in the map on the following page the principal agricultural and mineral productions or occupations: *e.g.*

Wheat ...	...	W.	Coal ...	...	|||||
Ranching ...	...	R.	Gold ...	...	++
Timber ...	...	T.	Copper ...	...	oo
Furs ...	...	F.			

Population.

Since the first Dominion census of 1871 the population of Canada has almost exactly doubled itself and it is now just over 7,000,000 [cf. the population of London, p. 50]. Of these about a quarter are of French descent, mostly living in the Province of Quebec.



Immigrants are still pouring in from all parts of the world, chiefly from the British Isles, the United States, and European countries. At present the population is settled in the southern belt which is most easily reached and has been proved splendidly fertile, but the railways are pushing branches further and further north across the whole breadth of the land, carrying settlers with them. Still, the country is so vast that the average number of persons to the square mile is less than 2.

What is the average per square mile in the British Isles?

The number of Indians is estimated at about 100,000. In proportion as the country is cleared for cultivation, their old hunting-grounds grow smaller, but the Government attends to their welfare so generously that their numbers are slowly increasing.

Towns.

As Canada is still mainly an agricultural country, it is only to be expected that there are few towns of the size of the large industrial centres of older countries; and it is true that most of the towns are small, but nothing is more surprising than the rapidity with which the larger towns have grown in a few years from the smallest beginnings. You will find that most of the towns mentioned below owe their origin and growth to certain geographical influences or human requirements. Some have natural advantage of position; others have grown up with the development of railways and canals as halting-places *en route*, or termini; others again meet the need of collecting and distributing centres in the agricultural and mineral districts, or flourish because they have close at hand some source of motive-power.

The Towns of the East.

[Population figures in brackets represent thousands, and each town of importance is compared with a town of roughly the same size in the British Isles.]

Quebec (78—cf. Reading). Its naturally strong position—on a bluff overhanging the river 300 feet below—led the early French settlers to make it their main stronghold: as the head of navigation (till the channel was deepened up to Montreal), it was for long the outlet of the St Lawrence valley and the terminus of the Atlantic voyage from Europe. The great forests of the neighbourhood make the export of timber the chief trade, and unlimited supplies of bark for tanning have created a leather industry.

Montreal (470—cf. Sheffield) is by far the biggest and busiest city in Canada: its position at the junction of several natural routes from different directions (consult the sketch-map) has made it the great collecting centre for the products of the country, brought by water or rail; and as the head of navigation and therefore the chief port of the St Lawrence, it is the most important outlet on the eastern side. These advantages, together with the fact that coal can be obtained by water from Cape Breton Island, have created a large industrial population engaged in transferring grain from lake boats and elevators to ocean vessels, in milling flour and in making paper (from wood-pulp): there are also iron works, distilleries and many other factories.

The city is on the island in the river and connected with both banks by the Victoria Bridge: through the S.E. corner of the island is the Lachine Canal by which vessels pass round the Lachine rapids into the upper river.

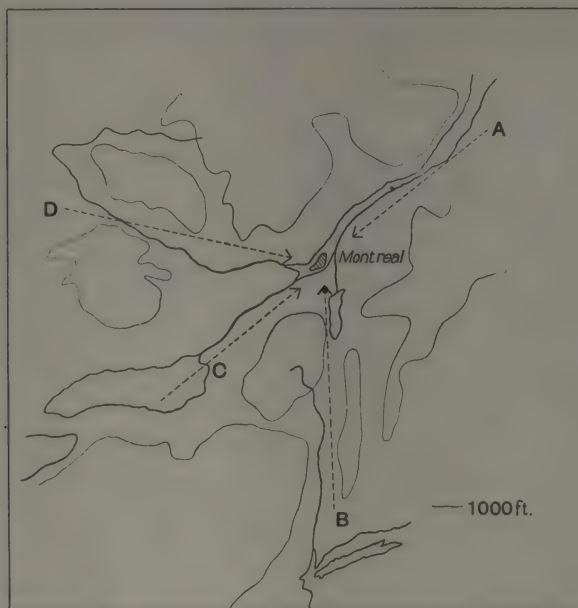
From the Atlas identify all the rivers and lakes in the sketch-map.

A—the line of entry from the Atlantic.

B—the approach from N. York through a natural gap.

C—the approach from the Great Lakes.

D—the approach from the Central Plains.



Section with red pencil the land above 1000 ft.

Ottawa (86—cf. Northampton) is situated at the head of navigation on the Ottawa river: as it is backed by immense forests, its chief trade is in timber: millions of logs are floated down the river every year to the Chaudière Falls, just above the city: here they are shot down through timber-slides to the water below and towed to the saw-mills for which the Falls provide unlimited power. There is direct water communication with Lake Ontario by the Rideau Canal. Since the formation of the Dominion in 1867, Ottawa has been the political capital, and the magnificent Government buildings are a striking feature of the city.

St John (42—cf. Dover) lies at the mouth of the St John river near the head of Fundy Bay, the great tide of which is responsible for the famous "reversible waterfall" into and out of the river. With the advantage of being free from ice all the year round, it serves as a winter port of outlet on the E. coast. (Refer to the railways in the Atlas.) It is a considerable fishing centre, but far more important

is its timber-trade. A great part of New Brunswick is covered with forests, and while **Fredericton** is the inland centre of the lumber industry, St John also has large saw-mills in addition to a great export trade.

Halifax (46), with its fine, ice-free harbour, is the Imperial naval coaling-station of the N.W. Atlantic, drawing supplies of coal from the Nova Scotia and Cape Breton coalfields. Its defence is now in the hands of the Canadian military authorities.

Why is Halifax, though nearer to Europe, less important than St John as a commercial outlet in the winter?

Sydney (17), on the Cape Breton Island coalfield, is growing in importance by reason of its iron and steel industry.

Charlottetown (11), the chief port of Prince Edward Island, has a good harbour and some industries, chiefly ship-building.



Federal Parliament buildings, Ottawa

The Towns or the Lake District.

The inland towns are mostly agricultural centres: the coast towns are the natural outlets of the district and are also largely occupied with the handling of the traffic which passes both westwards and eastwards along the great waterway.

Toronto (376—cf. Belfast) is the chief city of the Ontario Peninsula: with a fine harbour, it is a busy ship-building centre and its other industries include distilling and the manufacture of agricultural implements and some textiles.

Kingston (20) stands at the E. end of Lake Ontario at the junction of two water-routes—one from Montreal, by river, and the other from Ottawa, by the Rideau Canal. This position has helped it to become both a thriving commercial town and a place of some strategical importance. It contains the Royal Military College of the Dominion.

Hamilton (81—cf. Merthyr Tydfil) is also a lake port, and with a large iron and steel industry is the "Birmingham" of Canada.

London (46) lies in the heart of the richest country in the province and is an important agricultural market.

Sudbury is growing rapidly as the centre of a mineral district (nickel, copper) and an important railway junction, where the Canadian Pacific is met by a line from the wheat region round St Paul, in the United States.

Port Arthur (11) (with Fort William (16), four miles away) is the meeting-point of the lake route and the many railways that serve the productive north-west. It therefore has the handling of most of the export and import trade of the regions west of the Great Lakes.

The Towns of the Central Plains.

As the chief resources of this region were agricultural, towns originally sprang up at points which were convenient centres for collecting agricultural products for export and distributing the necessities that had to be imported. Some of them, possessing further advantages such as water-power and natural or artificial communications by water or rail, have advanced a stage further and are gradually becoming manufacturing centres, able to supply at any rate some of the local wants.

Winnipeg (135—cf. Blackburn, Birkenhead) is situated at the junction of the Assiniboine and Red rivers which then flow jointly into Lake Winnipeg, so that it has water-routes navigable by steamers in three directions for many miles. The rapidity of its growth is almost incredible: in 1871 it was a village of 250 inhabitants:



Fort Garry in 1837

(The trading-station which has grown into the modern Winnipeg)

by 1881 it had grown to 8000: in that year the Canadian Pacific Railway reached it and by 1891 the population was 25,000: the next ten years of steady development of the regions round it saw that figure nearly doubled, and in the last ten years the increase of immigrants in the central plains, the growth of railways, and the development of industries have caused a jump from 45,000 to its present figures. It is the gateway of the north-west, the great store-house of the whole region west of

the Great Lakes, and the most important railway junction: its manufactures are growing rapidly and it has the largest flour-milling industry in the continent.

Saskatchewan, being further west than Manitoba and more lately settled, has no cities to compare with Winnipeg, but **Regina** (30), **Battleford** and **Saskatoon** (12), already important railway junctions, will grow as the province develops its agricultural and mineral resources. At Regina are the headquarters of the N.W. Mounted

Police, a splendid force of six or seven hundred men who patrol the whole region between the Great Lakes and the Pacific, as far north as the Yukon district.

In the ranching district of Alberta, **Calgary** (43) is the chief town, supplying the needs of the mining districts in the Rockies: **Edmonton** (25) is a rapidly growing agricultural centre, and both towns will benefit from the extension of irrigation which is attracting more and more settlers every year.

The Towns of the Pacific Slopes.

In British Columbia, whose most important resources are minerals (coal, gold and silver), timber and fisheries (salmon and seal), the largest city is **Vancouver**



Victoria harbour, British Columbia

(100—cf. Middlesbrough). It stands on one of the many magnificent fiords of this coast and owes its origin to the fact that the Canadian Pacific Railway decided on making their western terminus there. It is the chief outlet of the S. part of the province, with a considerable export of minerals and timber. It is also the port of departure for Japan and the Far East. The important deposits of coal in the neighbourhood have been mentioned before.

Victoria (31) is beautifully situated on a fiord at the S. end of Vancouver Island, with **Esquimalt**—the Imperial naval coaling station of the Pacific—two miles away.

In the island are deposits of the best bituminous coal, and the city is the seat of extensive lumber industries as well as the headquarters of the seal fishing fleet.

New Westminster (13), near the mouth of the Fraser river, is the headquarters of the salmon fisheries, though other rivers of the province also abound with this fish. It shares with Vancouver and Victoria the canning of millions of salmon for export. The chief mining towns are **Rossland** and **Nelson**.

Outside of British Columbia, in the Yukon territory, lies **Dawson City**, the outcome of the gold discoveries in the Klondike district.



Saw-mill, New Westminster

Form of Government.

The Dominion of Canada consists of a number of self-governing Colonies, each managing its own local affairs. The Dominion Government is on much the same plan as our own: the King is represented by a Governor-General, who is assisted by a Canadian Privy Council: the Senate, consisting of life members appointed on the advice of the Privy Council, is the equivalent of our House of Lords: there is also an elected House of Commons. The work of Government is carried on by a Ministry representing a majority in the House of Commons.

In addition, each Colony has a Lieutenant-Governor and an elected Assembly, and the business of Local Government is conducted by a small Council representing a majority in the Assembly.

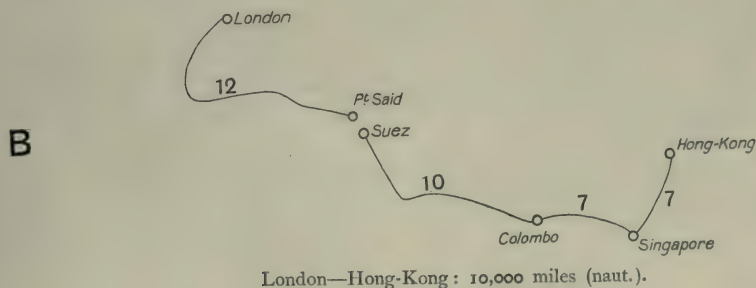
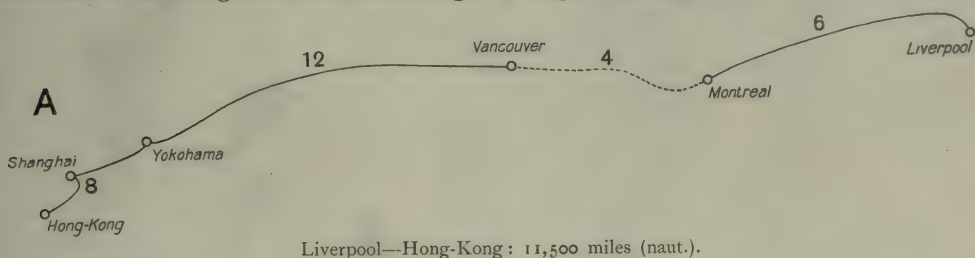
Just as each Colony controls its own purely local affairs, so the Dominion

Government manages the larger affairs that concern the common good of Canada as a whole, and it has always shown the most loyal readiness to work hand in hand with the Imperial Government on questions that touch the welfare of the British Empire.

Canada and her Communications with the outside World.

We have seen already how much the growth of Canada has been assisted by her inland water-routes and railways, and now that she is developing an important external trade, increasing attention is being given to her communications with outside countries.

Her business, both export and import, is mainly with the United States and with European countries, particularly the United Kingdom. In the former case, the fact that the boundary between the two countries is mainly artificial makes communication by water or rail (cf. Atlas) quite easy at almost any point, while the nearness of her neighbour also encourages a large coasting traffic.



In connection with the Old World, the trade of the country has been growing so rapidly that there is an ever-increasing demand for freight-vessels to carry Canadian products eastwards and to bring back manufactured goods from Europe: but there is not yet any call for such a superb service of fast passenger vessels as that which links Europe with the United States. The swiftest of these ships—the great Cunard liners—cover the 3000 miles between Liverpool and New York in less than 5 days, and first-class boats of other lines like the White Star, American, or Hamburg American, do not take very much longer. From New York the railway journey to Montreal occupies 12 hours. But the Canadian ports have an advantage over those

of the United States in being actually nearer to Liverpool, and already various shipping Companies—*e.g.* the Allan, Canadian Pacific Railway, and Dominion lines—have taken steps to meet the growing demands of trade and the requirements of business men and emigrants. As a result, Montreal can be reached from Liverpool in 6 or 7 days by the fastest boats in summer.

Lastly, though the volume of her trade across the Pacific is not yet very large, Canada has made successful efforts to establish good shipping communications with the Far East: in particular the service of fast "Empress" liners (Canadian Pacific Railway Co.) places Yokohama within 10 or 12 days of Vancouver and Hong-Kong is only 8 days further on, including stoppages at intervening ports of call.

The diagrams show you that Hong-Kong can be reached from Liverpool in about 30 days as against 36 or 37 days by the alternative eastward water-route through the Suez Canal.

The figures represent days.

These are the ordinary commercial routes: in emergency the time taken might be shortened.

N.B. The dotted part of line A is also reckoned in nautical miles, though it represents a land journey.

Consult Atlas, to identify the routes.

Answer the following:

- (a) *Which of the two lines looks the longer?*
 - (b) *By how many miles is it longer than the other?*
 - (c) *Why is the apparent difference in length so great when the actual difference in miles is so comparatively small?*
 - (d) *What is the rate of speed per hour between Liverpool and Montreal if the distance of 2800 miles is covered in 6 days?*
 - (e) *Make the same calculation for the journey of 3500 miles from London to Port Said which takes 12 days.*
 - (f) *If the 2500 miles' journey from Montreal to Vancouver occupies 4 days, at what rate would a liner have to travel to cover a similar sea distance in the same time?*
 - (g) *How long would it take to cover this distance in steamers travelling at the rate of those referred to in (d) and (e)?*
- What conclusions do you draw as to*
- (1) *the speed of the best Atlantic liners compared with that of the best on other ocean-routes?*
 - (2) *the time that can be saved by travelling overland instead of by sea?*

Newfoundland.

The island of Newfoundland lies across the Gulf of St Lawrence, and its northern extremity approaches within a few miles of the coast of Labrador. It has an area of just over 40,000 sq. miles, and is thus rather larger than Ireland.

Much of the coast consists of high cliffs broken by numerous inlets, the south and east coasts in particular being examples of typical fiords. Behind this rugged outline the interior forms an elevated plateau, from which rise low ranges of hills, the most important being the Long Range stretching along the west coast, and rising in places to 2000 feet.

The rivers are numerous, but of no great length, and a very striking feature of the country is the large number of lakes which vary in size from small ponds up to Grand Lake with an area of nearly 200 sq. miles.

The climate is rather more equable than that of the adjoining mainland, though the Labrador Current with its many icebergs drifting from the Arctic seas has a chilling influence on the eastern coasts. Off the S.E. shores, where this cold current meets with the warm moist airs over the Gulf Stream, there are constant fogs.

The resources of the interior are considerable but as yet little developed: parts of the country are suitable for agriculture, the forests are extensive, and there are deposits of iron, coal, and copper. But the great industry is **fishing**, which on sea and land provides the chief occupations of the people. Most important is the cod fishery over the "Banks" (cf. the Dogger Bank) which at depths varying from 10 to 100 fathoms stretch some hundreds of miles from the S.E. coast of the island.

During the season—June to November—at least one third of the population is busy fishing, in addition to thousands of fishermen from other countries both of the Old and New World. The fish are dried and salted, mainly for use in Catholic countries, and the annual value of the export is more than £1,000,000.

Next in importance is sealing. The seals are taken on the ice-floes which come southwards with the Labrador Current in the spring, and the value of the seal skin and oil is considerable.

Of other fish, herrings and lobsters are caught in large numbers in the sea, and salmon in the fiords and rivers.

On shore the chief industries are connected with fishing or lumbering: there is the making of nets and rope, the curing of cod, the canning of lobsters and salmon, and the extraction of oil from seal and whale.

There are more than 200 saw-mills in operation, and apart from the export of timber, the use of wood-pulp in the manufacture of paper has increased enormously of late to meet the growing demands of the public press.

Newfoundland was discovered by Cabot at the end of the 15th century, and by virtue of Sir Humphrey Gilbert's settlement in 1583 is our oldest colony, but for many years the island was used only as a fishing station for the boats of various European countries. It was not until the 18th century that any definite settlement was undertaken, and the first British Governor was appointed in 1728. Long before this the French had cast envious eyes on the island for the sake of its fisheries, and by the Treaty of Utrecht a portion of the coast was reserved for French fishermen. This concession and subsequent claims by the United States for fishing rights have been a constant source of trouble to the English Government, but the whole question has recently been settled satisfactorily by arbitration.

Newfoundland has refused to form part of the Dominion of Canada, and

maintains a Government of its own which administers the island and the adjacent coast of Labrador—constituted a dependency in 1765. As a Crown Colony it has a Governor, a Legislative Council appointed by him, and an Assembly elected by the people.

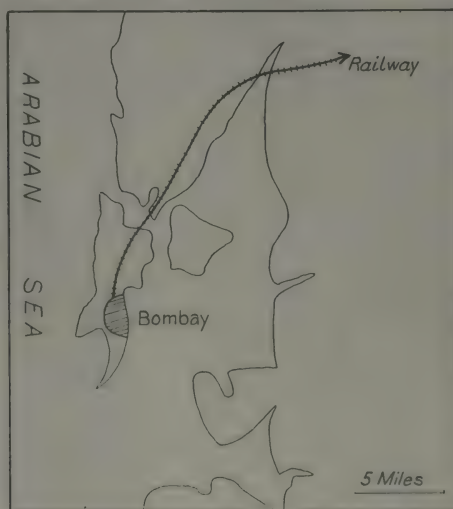
The population of the island is a quarter of a million, and the only town of importance is **St John's** (40), which is the capital and the headquarters of the fishing industry. It possesses a fine enclosed harbour, and is the nearest North American port to the British Isles, being less than 1700 miles from Ireland. From it a railway runs across the island to the west coast where steamers connect with Sydney in Cape Breton Island.

INDIA.

The Indian Empire is about 15 times the size of the British Isles, and stands third in order of size amongst the British possessions.

How does its size compare with that of Canada?

The island of Ceylon, which is nearly the size of Ireland, is separated from the mainland by a narrow strait across which an almost continuous reef of coral makes navigation impossible for all but small boats. From the Atlas find the shortest distance across this strait.



As the country is divided into two nearly equal halves by the Tropic of Cancer, it lies partly in the Temperate and partly in the Torrid Zone.

What is the latitude of the most N. and S. points?

Using the Atlas, find the number of miles between the N. and S., and E. and W. extremities. Compare these with the length of the British Isles from N. to S.

Surrounding Seas and Coasts.

Notice the names of the surrounding seas, and the ocean of which they form a part. The coast-line is nearly everywhere regular: such indentations as there are, *e.g.* the Rann of Cutch, are too shallow to offer the possibility of good harbours, and not one of the large rivers has a suitable estuary. At the mouths of the Ganges, Indus, and Irrawaddy great deltas have been formed, and only constant dredging maintains a clear channel to the commercial ports of Calcutta, Karachi, and Rangoon, which are the necessary outlets of productive valleys. Madras on the east coast has a purely artificial harbour, built at great expense to deal with the trade of the eastern lowlands.

The best natural harbour is that of Bombay on the west coast, which is sheltered on the seaward side by the island on which the city stands, and contains a sufficient depth of water.

Surface-Features.

Mountains, Plains and Rivers.

There are three very clearly marked divisions—the mountain country of the north, the central plain, and the peninsular plateau. Of these the most striking is the great mountain wall which on three sides shuts off India from the rest of Asia. The northern portion consists of a vast system of ranges, collectively called Himalayas, separating India from the high plateau of Tibet. Compared with our Pennine Chain, they are roughly ten times as long and as high, and five times as wide; towards the eastern extremity Mount Everest, the highest mountain in the world, rises to a height of 29,000 feet.

How many times is Mount Everest as high as Ben Nevis?

At either end of the Himalayas the mountain boundary is completed by ranges running southwards to the sea, cutting off Baluchistan on the west and Burma on the east from the rest of India. See Atlas.

Passage from one side of this mountain barrier to the other is nowhere easy: along the whole length of the Himalayas there is no pass at a lower elevation than 10,000 feet, and at the eastern end where the Brahmaputra valley suggests a line of entry from the north into Assam, the river flows through chasms and gorges which are quite impassable. Only in the north-west are there passes of recognised usefulness, and of these the most important are the Khaibar Pass, a defile leading into Northern Afghanistan, and the Bolan Pass, which connects Southern Afghanistan with the lower Indus valley.

But besides serving as a boundary, the mountains are of the utmost consequence in other ways. On account of their great height snow is perpetual over immense areas, and this, together with the many glaciers, guarantees to the rivers the constant supply of water that is so essential to the plains below. Again, the swiftness of the rivers flowing from so great a height causes the maximum of erosion, so much so in fact that the plains are largely built up of this eroded material. The result is that the alluvial soil, of unexampled depth, is extremely fertile, and is constantly

renewed by fresh layers of silt deposited by floods which are frequent during the season when the snows of the mountains are melting.

Three great river-systems, the Ganges, Indus and Brahmaputra (each about 1500 miles in length), drain for the benefit of India the northern as well as the southern slopes of the mountains.

How many times is each of these rivers as long as the Thames?

The Ganges rises at a height of 10,000 feet, and after a rapid descent flows slowly along the plain and empties its waters into the Bay of Bengal. At its mouth the current is so slight that an enormous delta, equal in size to England and Wales, has been formed, through which the river cuts countless channels to the sea. Of its many tributaries which stream off the southern face of the mountains the most important is the Jumna which runs a course of 1000 miles before joining the main river at Allahabad.

The Indus and Brahmaputra rise within a few miles of each other in the high land to the north of the main Himalayan ranges. Flowing eastwards through Tibet for more than half of its course, the Brahmaputra enters India at the eastern extremity of the Himalayas, and after passing through the valley of Assam joins the Ganges at the head of its delta. The Indus, after flowing in a N.W. direction for 500 miles, pierces the mountains and finally empties itself into the Arabian Sea. Its most important tributary is the Sutlej which rises close to the source of the Indus and breaks through the Himalayan ranges in a precipitous and impenetrable gorge.

It is the size of these rivers that makes them peculiarly important: not only do they offer facilities for irrigation on an immense scale, but also for navigation over long stretches. The Ganges has for centuries been a national highway for the greater part of its length: the Indus is navigable for more than half its course, and the Brahmaputra as far as the frontier of Tibet.

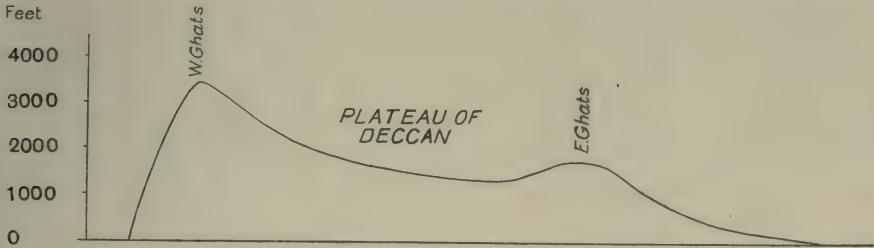
The Central Plain, stretching from sea to sea, includes the valleys of the Ganges and Indus and the higher land which separates them—nowhere more than 1000 feet high. The whole of this plain—in area four times as large as the British Isles—is eminently suitable for agriculture and consequently the richest and most densely populated part of the whole country.

Peninsular India. From the Indus-Ganges plain the land slopes gradually up to the triangular plateau of the Deccan, flanked on its three sides by mountain ranges. The Vindhya mountains run for 800 miles along the N. boundary, rising in places to over 4000 feet, and the other two sides of the triangle are the Eastern and Western Ghats.

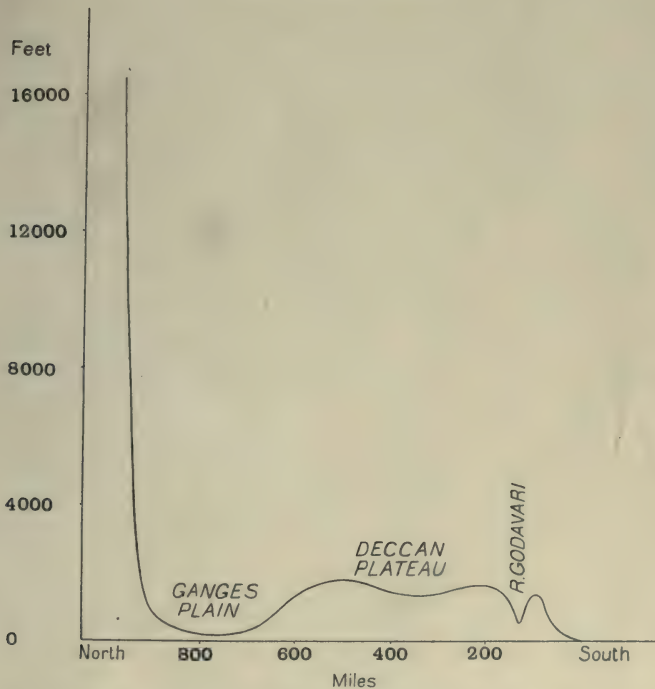
Between these latter ranges there are several points of difference. The W. Ghats form a continuous range within 50 miles of the coast, rising steeply from the sea to a maximum of nearly 5000 feet, and present a formidable obstacle to communication between the W. coast and the interior of the country. The E. Ghats are more in the nature of a series of disconnected hills and thus provide many passages to the sea. They rise less abruptly from the coastal plain which on this side is broader than on the west, and their average height is not much over 1000 feet. At their southern extremities these ranges combine to form the Nilgiri Hills; separated from

them by a narrow pass of low altitude are the Cardamom Hills stretching down to Cape Comorin.

The Deccan plateau varies in height from 1000 to 3000 feet and shelves gradually towards the east. The rivers therefore flow eastwards, though many of them rise close to the west coast. The most important are the Godavari, Kistna and



Section across the Peninsula.



North and South section through mouth of Kistna.

Mahanadi, but although of considerable length they are not easily navigable, and their value lies mainly in the deposit of alluvial soil round their mouths.

The Narbada and Tapti, flowing westwards, do not strictly belong to the Deccan. Their courses lie in deep narrow valleys and are difficult of navigation.

Burma is entirely shut in by high land and is cut off from the great plain of India by steep forest-clad mountains which have so far prevented railway communication. It contains one river-system of importance, the Irrawaddy, which flows almost due S. and is the great commercial highway of the province. Like all Indian rivers its delta is considerable, but navigation is easy for small steamers from the sea to Mandalay, a distance of about 500 miles.

The island of **Ceylon** rises from a coastal plain on all sides towards the centre where a maximum height of 8000 feet is attained. The rivers are of no commercial value but provide scenery of great beauty. The island is mostly covered with forest except where this has been cleared for agricultural purposes.

In the blank map on the opposite page shade all land which is over 1000 feet, and insert the rivers and ports which are mentioned in the text. Mark the position of the two chief passes.

How many miles are represented by an inch on this map?

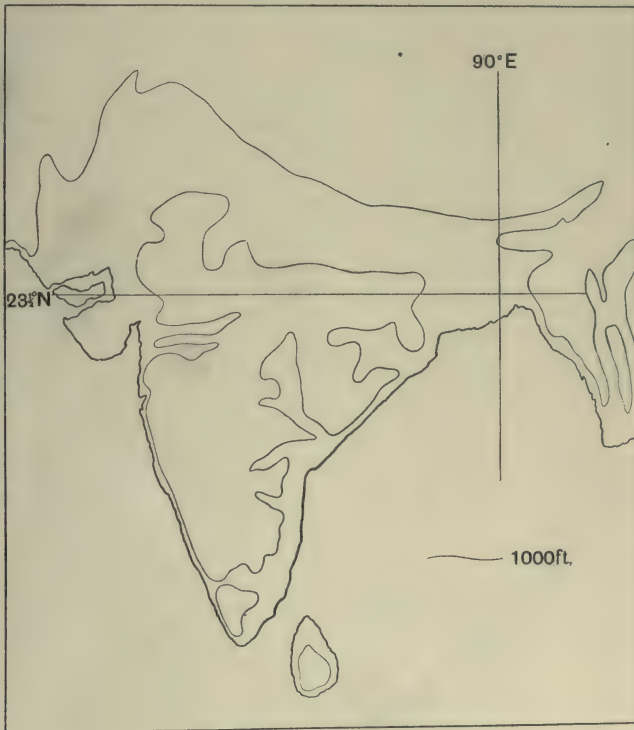
Perhaps in no other country of the world have historical events been so much guided and controlled by the surface-features as in India. The attraction to outsiders was furnished by the fertile plains of the north, whose wealth and prosperity were far-famed in Asia from the earliest times and regarded as proverbial in western Europe long before any Europeans actually visited the country. But easy approaches to these attractive regions were limited. The almost impenetrable barrier of the Himalayas has prevented the free movements of men into, or out of, India on that side. But in the N.W. mountains we have seen that there are passes leading from the interior of Asia to the Central Plains of India. It was these natural gateways that admitted the earliest invaders who settled in the Indus-Ganges plain, driving the original population into the mountains of the north or the wilds of the Deccan. From that time for centuries onward, entering always by those same N.W. passes, wave after wave of conquerors rolled over northern India, each contributing in some degree to the mixture of races which inhabit India to-day. The last of these great movements from the north-west resulted in the creation of the powerful Mogul Empire (about the time of our Elizabeth) with its centre at Delhi. During all this time, too, there was a certain volume of trade flowing backwards and forwards through these same channels. Through Khaibar or Bolan Pass marched caravans bearing the spices and silks of India to Europe from early Roman times till well into the Middle Ages.

The 16th century saw the first Europeans arrive in India, not overland, but by the sea-route discovered by Vasco da Gama. These new invaders entering from the south, established themselves first on the coast, but later set themselves to acquire the rich interior, and thus the same fertile central plain once more became a battleground where the last of the N.W. invaders strove for supremacy with the English advancing from the S.E.

In more modern times the influences of the surface-features are still felt. The wild tribesmen of the N.W. frontier continue their raids on the lowlands, partly because plundering the less hardy lowlanders is an hereditary pastime, and partly on account of the sense of security that the nearness of their mountain fastnesses gives them.

Still, too, the importance of the N.W. passes is recognised by the steps we have taken to defend India from possible invasions on that side, while the northern boundary, almost as difficult to pierce as ever, occasions us no misgivings in that direction. Quetta, Peshawar, and neighbouring cantonments such as Rawal Pindi are the chief points at which we concentrate our defences.

Lastly, though the overland trade through the passes has greatly diminished, they may again be used for highways of commerce as affording the only possible lines for railways. Already a railway has been built through the Bolan Pass and only a few hundred miles of rails are required to establish through connection overland from London to Karachi. [The Atlas shows the Russian line completed to Kushk in the N.W. of Afghanistan, and the British line to Chaman in the S.E.]



Climate.

It has been shown that the climate of the British Isles is determined mainly by the presence of a large ocean on the west. In the same way the climate of India is influenced by the Indian Ocean which lies to the south, but there is this difference, that the prevailing wind of the British Isles is always from off the sea, whereas your Atlas shows that in the case of India the wind is off the sea during the summer, but off the land during the winter.

Temperature.

Lying partly in the Tropics, India is naturally a warmer country than either the British Isles or Canada, but, apart from this fact, latitude has little influence on the temperature. The isothermal map shows that in summer the hottest part is not in the Tropics but in the extreme north. What is the highest temperature shown on the map? This is due to the fact that the north is the continental part of the country, whereas the heat of the more tropical south is tempered by the influence of the sea, particularly the west, which is the windward, coast. The difference however is not great, because at this season the sun is directly overhead (see diagram, page 2), and the whole country has a high temperature. In the N.W., temperatures of between 110° and 120° F. are not uncommon.

What is the highest shade temperature that you have experienced or heard of in the British Isles?

In winter the continental north is coldest (what is the lowest temperature shown?), and the heat increases as you proceed southwards towards the sea and towards the latitudes in which the sun is directly overhead. Notice that although the wind is N.E. at this season the great height of the Himalayas prevents the extreme cold of Central Asia from being carried into the country.

We see then that the range of temperature in the south is more maritime than that of the north.

Find the height of the mountains at the source of the Ganges. You will find that in January the isotherm of 60° F. passes through this district. What will be the actual temperature there at this season?

Why should government officials move from Calcutta to Simla (on the S. slope of the Himalayas) for the summer months?

Rainfall.

Now look at the rainfall-map and consider how the winds and height of land determine the rainfall.

Refer to page 19, and say what is the usual prevailing wind in the latitude of India. Notice that this is actually the case in the winter months, but from June to October the great heat of the north, with the consequent rising of the lighter air, results in a cooler wind being drawn in from the sea (cf. Canada). This is the South-West Monsoon. [Monsoon = Arabic name for a seasonal wind.]

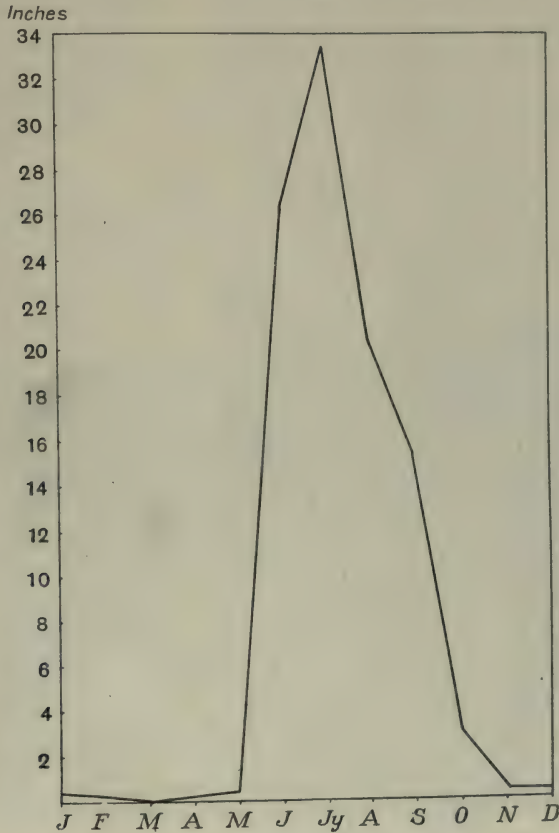
Now examine the rainfall maps. Why is the winter rainfall so light? Why does Ceylon get more rain at this time? Why is the summer rainfall so heavy in some parts?

We see then that India depends entirely on the S.W. Monsoon for its rain, and it is of the utmost consequence to the country that its extensive and lofty mountain areas can, during the short time available, secure the maximum of condensation. Thus along the W. Ghats the fall averages over 100 inches, whereas the Deccan plateau has but little rain. On the still higher mountains of Burma and Assam the amount is even greater, and nearly all of it falls during this short period.

After blowing across the Bay of Bengal and coming into contact with the mountains

in the north-east, this wind is deflected up the Ganges valley as a S.E. wind, and more rain falls in the Ganges plain than might otherwise be expected.

In the lower part of the Indus valley the rainfall is very small, being less than 10 inches a year. On the map notice the name of this desert region. This low-lying district is unable to break the rain-bearing clouds which therefore retain their moisture until they reach the Himalayas, on which they discharge a heavy fall of rain.



Graph of Bombay Rainfall.

In conclusion you must note :

(i) that rain can be looked for only during a certain part of the year : if during that period the rainfall is from any cause below the average (sometimes, for instance, the monsoon arrives late), there is no chance that the other part of the year may make up the loss ;

(ii) that the rainfall is unevenly distributed over the country owing to the varying character of the surface-features.

To one or both of these circumstances is to be attributed the occasional occurrence of local famines.

Occupations.

We have seen that in our own country manufacturing industries hold a more prominent position than agriculture, and we attributed this mainly to the extent of our coalfields. Now India is not a large producer of coal, and there are two facts which combine to ensure the success of agriculture—firstly, the great depth and fertility of the alluvial soil in the Indus-Ganges plain, and secondly, the combination of tropical heat with heavy rainfall. As a result we find that India is essentially an agricultural country, and about three-quarters of its population are engaged in agricultural pursuits.

In these circumstances you will realise the anxiety with which the S.W. Monsoon is awaited, for upon it depends the success or failure of what is almost the only



Transplanting Rice

occupation of the people. The rain which falls during the few months of the wet season has to last for the whole year, and this involves the immediate storage of water which may afterwards be used for irrigation purposes.

In the Indus-Ganges plain the rivers are well supplied with water by the snow and glaciers of the Himalayas, and here irrigation consists of conducting the water from the rivers by a system of canals, so that it may reach all parts of the plain. But in peninsular India the rivers depend for their water supply on the monsoon rains, and before it runs off this water must be stored in huge reservoirs from which it can be spread over the country during the remainder of the year. On the plateau

of the Deccan and in other districts where the rainfall is not heavy, a spell of drought means failure of the crops, and by stopping the demand for labour may lead to famine.

In no country, then, is irrigation so essential or carried out on so large a scale, with the result that many districts are now available for agricultural purposes which were formerly uncultivable. Add to this the development of the railway system which has made it possible to convey food quickly to the afflicted districts and you will understand that famines now have far less disastrous consequences than of old.

Agriculture. *Why would you expect the agricultural products of India to differ in character from those of the British Isles and Canada?*

We may divide the crops into two classes, one producing foodstuffs, the other, material for manufacture. Of the former the following are the most important.

Rice, requiring tropical heat and abundant moisture, is well suited by the Indian climate. It is grown round the river deltas where the flooding of the rice fields, so necessary during the early period of growth, can be easily carried out. The largest producing areas are the deltas of the Ganges and Irrawaddy. For reasons of religion,



Tea Plantation

climate, and economy, the natives eat but little meat, and the Bengal rice is almost entirely retained for home consumption, while in Burma it is grown mainly for export. *Can you suggest a reason for this? From what port would you expect an Indian vessel laden with rice to have come?*

Millet is a grain on which, to a greater extent even than rice, the natives depend for their food, and only a very small quantity leaves the country. There are many varieties of the plant and it is grown almost universally.

Tea is grown largely in Assam, Ceylon and on the Nilgiri Hills, where a damp and warm atmosphere is assured. Although a heavy rainfall is necessary,

good drainage is essential, and the shrub is therefore cultivated mainly on hill slopes. Of the Indian tea nearly all is exported, and nine-tenths of it comes to the United Kingdom, but the number of tea drinkers in India is now on the increase.

Wheat flourishes where the climate is most like that of our own country, *i.e.* in the Punjab and United Provinces where it is grown as a winter crop. Of the wheat imported into England, India supplies more than any other country except Russia.

From what port would the Punjab wheat be shipped?

The **sugar cane** is cultivated in the well-drained alluvial soil of the United Provinces and Bengal, but the consumption of sugar is so great that additional supplies have to be imported.

The most valuable crops which provide material for manufacture are cotton and jute.

The **cotton** plant is grown mostly in the northern part of the Deccan plateau, in the Presidency of Bombay, where the fertile "black soil" (of volcanic origin) has the advantage of retaining moisture for a long period. Large quantities of this cotton are exported, some to the cotton-mills of this country, but far more to Japan. The value of exported cotton in 1911 was over £20,000,000. On the other hand the manufacture of cotton in India has been steadily increasing, and a considerable amount of the raw material is now kept in the country for this purpose.

From what port would raw cotton be shipped to England?

Jute is confined almost entirely to Bengal and requires the same conditions as rice. Though formerly grown for export only (see page 42), the fibre is now largely used in the mills of Calcutta and neighbouring towns, where it is made into canvas and sacks.

Of other products we will only notice the following:

Linseed is grown in India chiefly for its oil, though in cooler countries it is grown also for its fibre (flax). It is mostly sent to the soap and candle factories of Great Britain and other European countries. Other oil seeds are cultivated, and the export of seeds is second in value only to cotton.

The **opium** poppy is grown for the drug: it is exported principally to China, and has been a fruitful source of revenue to the Indian Government to which the growers are bound to sell their crop.

Indigo has from early times been cultivated in India for the dye which is obtained from its leaves, but the industry has suffered severely from the artificial production of the dye by a chemical process, and the output is rapidly diminishing.

Tobacco is grown in many parts of the country, more especially in Bengal and Madras.

Timber. India still contains large areas of uncleared jungle, and the Himalayan slopes are forest-clad except where they have been cleared for cultivation. Of the many forms of timber which are procured some (*e.g.* rosewood, ebony, sandalwood) are used for carving and cabinet work, at which the people are particularly skilful, while teak, obtained mostly from Burma, is on account of its hardness and durability used for boat-building. There is also a great demand for timber to make chests for the export of tea and other commodities.

With regard to pastoral occupations, **cattle** are bred, not as in other countries for meat and dairy produce, but chiefly for work on the land, such as carting and ploughing.

Sheep are of an inferior breed and the wool is of poor quality. The best is obtained from the Punjab and the Frontier Provinces, and much of the wool is used in the making of shawls and pile carpets. "Cashmere" (Kashmir), which was originally obtained from goats, is now used as a name for many kinds of soft woollen goods.

Large quantities of hides and skins are exported, especially after years of drought when the mortality is great. They are sent mostly to the United States, Germany and Great Britain, and the value of those exported in 1910 was nearly £10,000,000.

Manufactures and Minerals.

In a country where agriculture is all-important there would appear to be little room for industrial pursuits. There has always been in India a small minority of craftsmen famous as carvers in ivory, metal and wood. The finest ivory work is done in some of the native states of the Deccan, and African ivory is now mostly used as being of superior quality to that obtainable in India.

Ornamental metal-work in gold, silver, copper and brass is still carried on in all parts of the country, and the brass work of Benares is particularly well known. Unfortunately this form of Indian art has largely deteriorated owing to the import of cheap manufactures from Great Britain. These inferior designs are copied by the Indian worker, and the standard of his work has thus been lowered. The lacquer ware of Burma is also known all over the world. Lacquer is the product of a plant and is applied to woodwork in the form of a varnish.

The weaving of fabrics too—cotton, silk and wool—has provided work for the hand-loom in many districts from time immemorial. But all the world over the old handicrafts have been dying out in the face of the competition of steam-driven machinery, and India, helped by the recent development of the coalfields, has proved no exception.

Coal is the most important mineral worked in India, and the output has been doubled during the last ten years, though the quantity produced (about 12,000,000 tons annually) is even now insignificant compared with that of the British Isles. Five-sixths of the supply is mined in Bengal, the largest coalfields being situated about 100 miles N.W. of Calcutta. Until recent years the railways have consumed the greater part of the coal, but the increased output now provides a surplus for manufacturing purposes.

Industries naturally grew up first in the neighbourhood of the coalfields, and the earliest factories were established in Calcutta. Progress has been continuous: within the last fifty years the banks of the Hugli have been lined with jute-mills, and to-day the value of manufactured jute is equal to that of the raw material exported. With the spread of railways the manufacturing spirit has been carried to other parts of the country where large supplies of raw material are ready to hand: thus the cotton-growing region of the N.W. Deccan has made Bombay a great manufacturing city whose cotton-mills, constantly increasing in number, now give employment to thousands of hands.

Other industries include the manufacture of woollen goods (chiefly in the form of blankets and carpets), dyeing, which has increased with the development of the cotton industry, and tanning.

Of other minerals besides coal the most important are gold and petroleum. **Gold** is obtained from the native state of Mysore, to the value of over £2,000,000 annually.

Petroleum is a mineral oil which in recent years has become of great importance due to its use as fuel for marine engines and the increasing demand for petrol. No other mineral has been developed so rapidly in India, and the output has during the last ten years increased fourfold to over 200 million gallons annually, nearly the whole of which is obtained from Burma.



Oil Wells

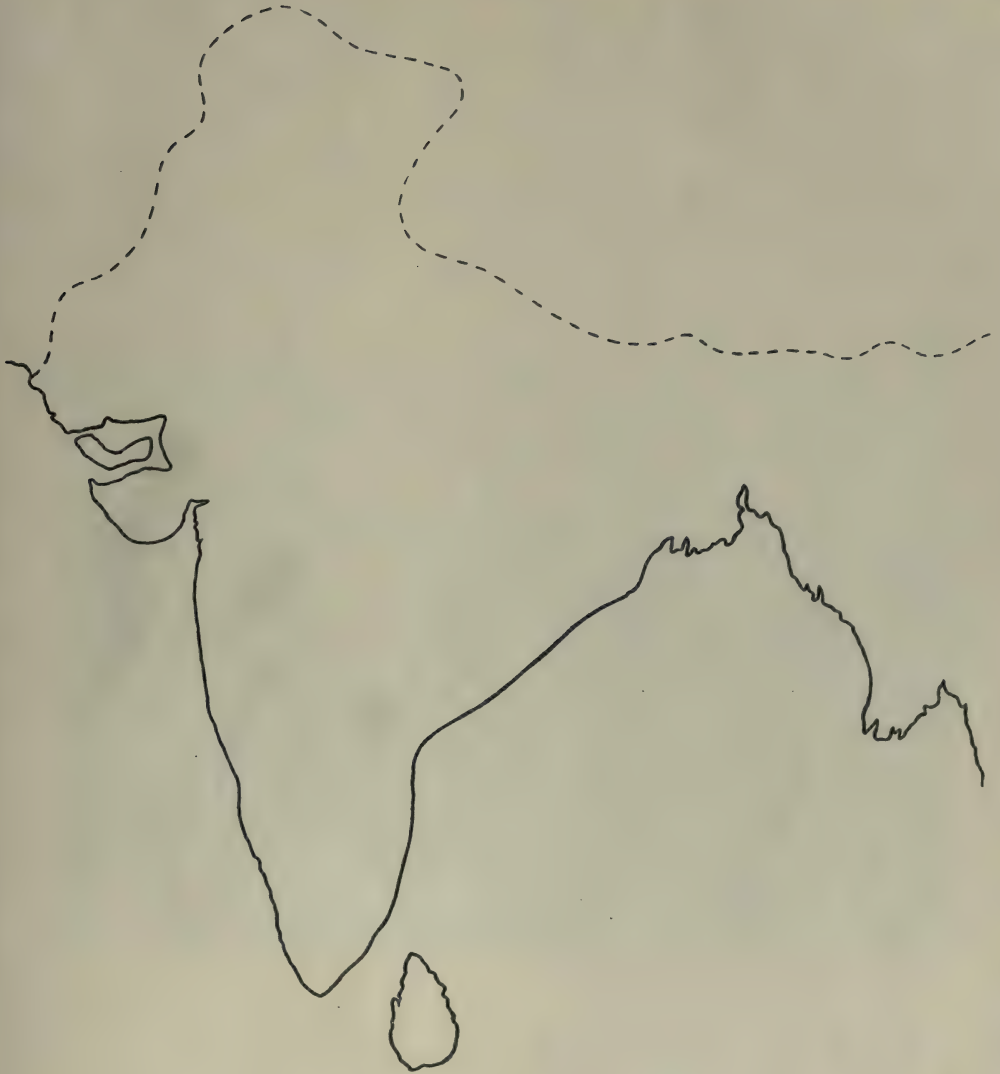
Iron ore exists in many parts of the country, but little smelting is done except near the coalfields of Bengal, and the steel machinery required for the factories and railways is mostly imported.

Salt is mined in the Salt Hills of the Punjab, and is also obtained by the evaporation of salt water, a process rendered possible by the dry heat which exists during a large part of the year.

Of precious stones the only one found in any considerable quantity is the ruby, which is mined in Burma.

Insert in the map on the opposite page all the agricultural and mineral products mentioned in the text, thus:

Wheat	... <i>W.</i>	Cotton	... <i>C.</i>	Coal	... |||||
Rice	... <i>R.</i>	Jute	... <i>J.</i>	Gold	... ++
Tea	... <i>Tea</i>	Tobacco	... <i>Tob.</i>	Petroleum	... <i>Pet.</i>



Population and Towns.

From what has been said we may conclude that the occupations of the Indian people are mainly agricultural, but that with the development of the coalfields manufacturing industries are on the increase.

These facts necessarily influence the distribution of population, the most thickly populated districts being those most suitable for cultivation—the Ganges basin and the coastal plain on the east of the peninsula—and we find that two-thirds of the

population live in one-third of the area (cf. Scotland, page 49). In these districts the distribution of the people is as even as is usual in an agricultural country. Thus in a country whose population is one-fifth of that of the whole world, there are only eight towns with a population exceeding a quarter of a million (cf. British Isles, page 50), and nine-tenths of the people live in villages or towns of less than 5000 inhabitants.

At the same time the development of manufactures and the formation of trading centres are causing the larger towns to increase rapidly, and the expansion of foreign trade is responsible for the growth of the sea-ports; *eg.* the great agricultural and mineral resources of Burma have resulted in the population of Rangoon being trebled during the last thirty years.

The total population of the country as shown by the census of 1911 is 315 millions. Of this number only a quarter of a million are Europeans, the majority of whom are soldiers or employed in the Government Civil Service.

What is the density of the population per sq. mile? (Cf. British Isles, page 50.)

This total shows an increase of over 20 millions during the preceding 10 years, and the steady growth of the population may be attributed to the great progress which has been made in (i) the opening up of new agricultural land as the result of irrigation, (ii) the construction of railways, (iii) the development of the coalfields, and (iv) the manufacture of cotton and jute. Even now there remain districts which with the help of irrigation might be profitably cultivated, so that the country may support a still greater population. The cities containing about or over a quarter of a million inhabitants are here given for reference:

Calcutta	1 $\frac{1}{4}$ millions.	Rangoon	} $\frac{1}{4}$ million.
Bombay	1 million.	Lucknow	
Madras	} $\frac{1}{2}$ million.	Delhi	
Hyderabad (Deccan)		Lahore	

There are, however, other towns worthy of mention, and it will be found that the majority owe their importance to one or other of the following considerations:

- (i) Geographical position.
- (ii) Development of railways.
- (iii) Need for trade centres.
- (iv) Military requirements.
- (v) Demands of health.
- (vi) Religious or historical interest.

[The figures in brackets represent the population in thousands.]

Towns of the Northern mountains.

Peshawar (98, cf. Wolverhampton), **Rawal Pindi** (86) and **Quetta** (34) are military stations amongst the hills of the N.W. frontier, which we have seen is the only quarter where a land force could invade the country (see page 85). The two former are in direct railway communication with Calcutta, and all three are connected by rail with Karachi, the port at which troops from this country would disembark.

Peshawar lies over against the eastern entrance to the Khaibar Pass and is also an important trade centre, dealing largely in woollen carpets and skins. Quetta, the most southerly of the frontier stations, commands the Bolan Pass through the mountains of Baluchistan.

Simla, at a height of 7000 feet, is the summer residence of the Indian Government (see page 86), while **Darjeeling**, situated amongst some of the grandest mountain scenery, is within easy reach of Calcutta; the healthy climate, due to their altitude, makes them favourite hill-stations for Europeans during the hot season.

Srinagar (126) is the chief centre of the Kashmir woollen industry, and manufactures shawls and carpets.



Simla

Towns of the Central Plain.

Calcutta (1,220), the second largest city in the Empire, lies on the Hugli about 80 miles from the sea, and until 1912 was the capital of British India. It was founded towards the end of the 17th century by the East India Company. Later this Company undertook the administrative work of the country till the time of the Indian Mutiny (1857), when entire control was handed over to the Crown.

The city owes its rapid growth to the following influences:

- (i) its position at the outlet of two large rivers whose valleys form the most productive parts of the country;
- (ii) the extension of the railway system, and the consequent increase of its export trade;

(iii) its industrial progress, due to the development of the Bengal coalfields and the local supply of raw material (jute).

As a result the city has increased sixfold during the last 100 years and has become one of the chief trading centres where the eastern and western worlds meet. This has justified the enormous sums of money spent on the improvement of the harbour, which on account of shifting sandbanks is very difficult and requires constant dredging.

Howrah, on the opposite bank of the river, is the terminus of the railway, and is connected with Calcutta by a large floating bridge. It is the chief centre of the jute industry.

Patna (136), at the junction of the Ganges with two of its large tributaries, is an important commercial town and the centre of the opium trade.

Benares (204), the oldest city of India and one of the oldest in the world, dates from about 1200 B.C. It is the most holy city of the Hindus, containing many temples of great architectural beauty, and the "ghats" or landing-steps on the Ganges are much frequented by pilgrims anxious to bathe in the sacred river. Metal-work, for which the city has been famous for many centuries, is still an important industry.

Allahabad (171) is another holy city, lying at the junction of the two sacred rivers Ganges and Jumna. This position has also given it a commercial importance which is further increased by the fact that it is the junction where the line from Bombay meets the trunk line from Calcutta to the north-west.

Lucknow (260, cf. Nottingham) and **Cawnpore** (178) are two towns famous for their historical associations in connection with the Mutiny. Both are now important railway junctions. Lucknow lies in the centre of a rich agricultural district and is also engaged in metal-work, while Cawnpore specialises mostly in the manufacture of leather goods.

Agra (185) on the Jumna is noted, like many of the more ancient cities, for the beauty of its architecture. Its position makes it an important trade centre, and there is some manufacture of cotton goods.

Delhi (232, cf. Portsmouth) was in the early times the capital of India, and has always been considered as such by the Hindus. It has now regained this honour from Calcutta. In more recent times it has become a great commercial and railway centre, the railways collecting the produce of the surrounding districts, particularly the Punjab wheat. Delhi has also a reputation for ivory-carving, and the events connected with its capture during the days of the Mutiny will always give it an historical interest. During the last 20 years the city has grown considerably and will still further increase now that it has become the headquarters of the Government.

Lahore (228) lies in the wheat-growing district of the Punjab and is the capital of that province. It is the junction of many railways radiating in all directions (see Atlas) and is an educational centre.

Amritsar (152), not far from Lahore, is the religious headquarters of the Sikhs, a race which provides the finest type of native soldier. It is also a wheat and wool market and is noted for its weaving of woollen carpets, the raw material for which is obtained from the highlands of Kashmir.

Karachi (152, cf. Sunderland) is the outlet port of the Indus valley and exports the large wheat supplies of the Punjab. The opening up of fresh wheat-growing districts as a result of the development of irrigation works, and the improvement of the harbour, have resulted in the very rapid growth of the city during recent years, and the population has been more than doubled during the last 30 years. The completion of the Suez Canal has greatly added to the prosperity of the port, and the construction of the railway to the military stations of the N.W. frontier has given it a further strategic importance. Its position as the most westerly port of India may some day make it the terminus of the railway that is to be built across Persia.

Towns of the Peninsula.

Foremost among these is **Bombay** (979, cf. Glasgow), which vies with Calcutta for the position of the leading sea-port. Two events in particular have led to the great development of this city—the opening of the Suez Canal in 1869, and the completion of railway communication with the cities of the Ganges plain. Before the canal was built Calcutta monopolised the greater part of the English trade, but Bombay, facing the entrance to the Red Sea, is now the most convenient port of call for vessels arriving from England and for the export of goods (*e.g.* cotton) to this country. Standing on an island, with high land running parallel to the coast opposite, Bombay was for long cut off from easy communication with the interior, but in recent years engineering skill has connected her with all parts of the country by railways carried on causeways to the mainland and then penetrating the mountain rim at different points.

The nature of its harbour has been already described (see page 81).

Unlike Calcutta it has no great waterway leading into the country, nor has it the advantage of a local coal supply. This, however, can now be obtained without difficulty, and Bombay has become a great industrial city (see page 91).

Further to the north, **Ahmadabad** (215, cf. Leicester) is situated in the most productive cotton-growing district, and ranks second only to Bombay in the importance



Indian Temple

of its spinning and weaving industries. It is also interested in the working of silk and gold thread.

Of other towns on the western side two are interesting historically :

Calicut is the oldest of the Indian ports and has given its name to calico.

Goa (still in the hands of Portugal) was the headquarters of the Portuguese



A rubber estate

traders who were the first to establish themselves in India after Vasco da Gama's discovery of the sea route round the Cape. It was then one of the wealthiest cities in the country but has long since completely decayed.

On the east of the peninsula the largest city is **Madras** (518, cf. Birmingham). Although it possesses no natural harbour and access from the sea is even now difficult,

Madras has developed into a port of considerable size, as the coastal plain is very productive, particularly in the neighbourhood of the river deltas, and there is no other harbour at which the produce of this district can be dealt with. The city extends for several miles along the shore, and contains a few cotton factories, but is not a centre of great industrial activity.

Of the inland towns we may notice **Hyderabad** (500) which with its suburbs is the fourth largest city of India, and is situated in the heart of the Deccan plateau. It is the capital of the largest and most important native state.

Poona (158), at a height of over 2000 feet, stands at the eastern entrance to the pass through which the railway from Bombay to Madras penetrates the Western Ghats. Lying at sufficient altitude to have a moderate temperature, it is yet sheltered by the Ghats from the heavy monsoon rains, and is the summer residence of the Governor of Bombay.

Bangalore (189), the capital of the native state of Mysore, enjoys much the same advantages as Poona, and on account of its healthy climate is used as a military station. It is an important railway centre and possesses several cotton-mills.

Trichinopoly (122) is one of the towns engaged in the manufacture of tobacco, and its gold-work has a considerable reputation.

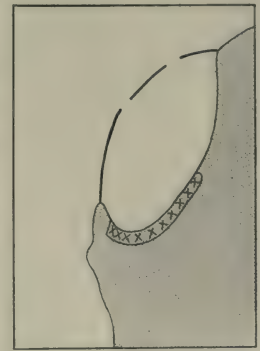
Towns of Burma.

Rangoon (293, cf. Bradford) is the outlet-port of the rich Irrawaddy valley and its position at the mouth of the great highway of the country has ensured its rapid growth (see page 94). Large quantities of rice, timber and petroleum are exported, and the extension of the railway combined with the increasing development of the country has greatly added to its trade. Factories for the cleaning of rice and refining of petroleum give employment to a large population, and the older industries connected with the working of metals are still maintained.

Mandalay (138), about 500 miles from the mouth of the Irrawaddy, was the old capital of the country, and is a trade centre of some importance collecting the produce of the surrounding districts, but both in importance and population it has declined in proportion as Rangoon has grown.

Towns of Ceylon.

Colombo (200) is the capital of the island. Its position makes it an important port of call for vessels in the eastern seas, and the meeting-point of many lines of steamers from Europe, Africa, Australia, China and Japan. It has a large trade in the export of tea and rubber. The artificial harbour has been so much improved by the addition of two breakwaters that it has taken the place of the fine natural harbour of **Trincomali** as the chief naval station in Indian waters.



— — Breakwaters

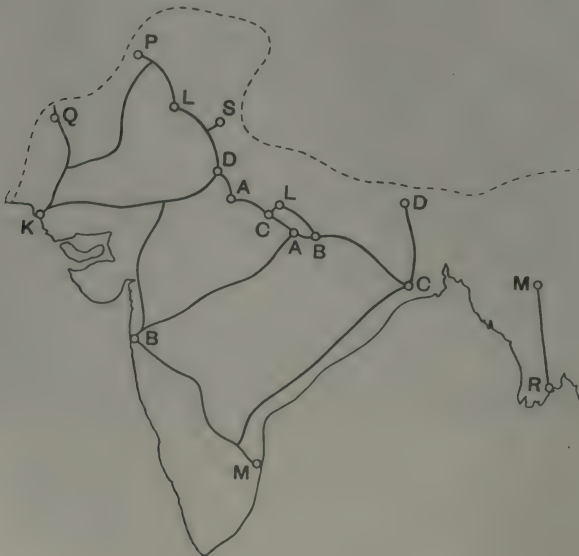
Colombo Harbour

Railway Communications.

Three distinct objects have influenced the construction of railways in India—firstly military requirements, secondly the development of trade, thirdly the relief of famine. Most lines have in the first place been built for one or other of these objects, though later they have become valuable in other ways as well.

The Afghan war in 1878 impressed upon the government authorities the necessity of completing a railway system by which troops could be concentrated quickly in any danger zone, and the main lines connecting the N.W. frontier with Calcutta and Karachi were constructed primarily with this object. Each of these lines, however, has acquired an additional importance as the main outlet for the immense agricultural resources of the Ganges and Indus plains, and with the addition of branch lines in all directions the whole of this area has been put in communication with the sea-ports. In peninsular India railway construction is naturally less easy, but the surmounting of great difficulties presented by the W. Ghats has given Bombay communication with every part of the country, and further, the relief of famine in those districts most liable to it (*i.e.* the eastern side of the W. Ghats) has been secured by the linking up of this area with the more prosperous regions of the north.

The map below shows some of the more important railway routes. Identify the names of all the towns whose positions are marked.



Form of Government.

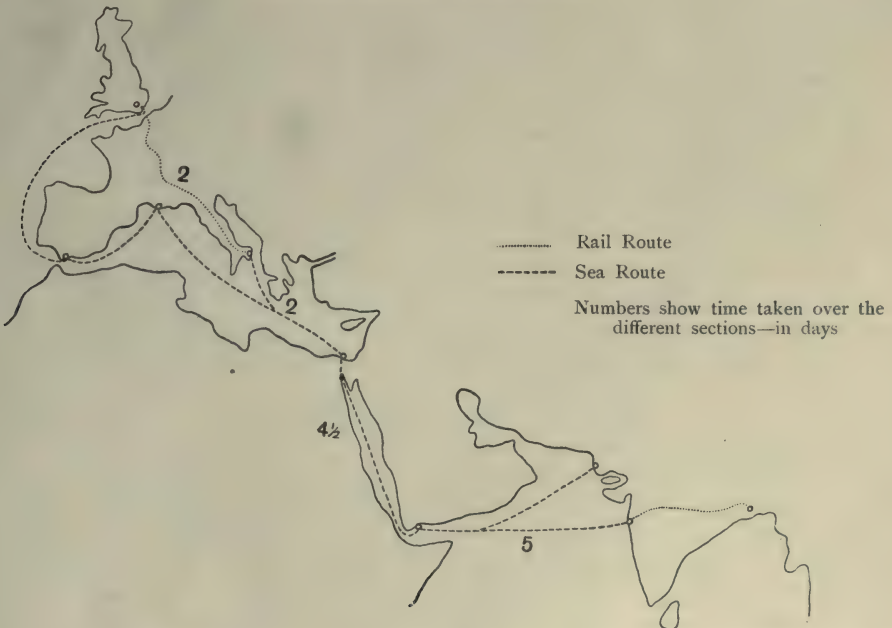
The Empire of India consists of a number of provinces directly under British government and a number of native states which, under native princes, are completely independent so far as the management of their own affairs is concerned, but subject to British control in matters affecting the country as a whole.

The government of the Empire is in the hands of a Secretary of State in London, who is responsible to Parliament for the administration of the country. He is assisted by the "Council of India," a body consisting of about twelve members.

In India the King is represented by a Governor-General or "Viceroy" who holds office for five years, and is assisted by a Legislative Council consisting of the military commander-in-chief and six other members. The Viceroy and his Council are referred to as the "Governor-General in Council," or the "Government of India," and with them rests the supreme authority in the country.

Each province has its own Governor and Council for the control of local affairs, while the "Government of India" manages the larger affairs of the country.

Ceylon is not under the control of the Indian Government but, like most of our smaller colonies, is administered by the Colonial Office, and has its own Governor and Council.



India can be reached from this country in a fortnight by travelling overland to Brindisi (S. Italy) and through the Suez Canal to Bombay, but at least another week must be added if the journey is to be made entirely by sea. (See map above, and compare with the map on page 77.)

The distance from London to Bombay by the all-sea route is about 6000 miles.

AUSTRALASIA.

Australia.

Australia is the smallest continent and the only one which lies entirely in the Southern Hemisphere. In area it is about four-fifths of the size of Europe, or 25 times the size of the British Isles, and with the exception of Canada is the largest portion of our Empire.

How does its area compare with those of Canada and India?

Tasmania, which is included in the Commonwealth, is a little smaller than Ireland (cf. Ceylon).

Find the name and breadth of the strait which separates it from the mainland.

As is the case with India, Australia lies partly in the Tropics and partly in the Temperate zone, the latter portion being the larger.

What is the name of the Tropic which passes through Australia?

Between what latitudes does the continent lie? How do these figures compare with those of India?

Measure the breadth of the continent from east to west, and the greatest length from north to south.

Coasts.

Australia is peculiarly compact in shape, with a smaller proportion of coast-line to area than any other continent. The coasts are for the most part regular in outline; e.g. the shores of the Great Bight in the south are unbroken by even a river mouth for a distance of 1000 miles. This monotonous regularity is relieved in the N. by the Gulf of Carpentaria, and in the S.E. and N.W. by numerous inlets of the fiord type, and it is here that we shall find the best natural harbours.

The most noticeable feature of the coast-line is the Great Barrier Reef which extends for over 1000 miles along the E. coast of Queensland and is the largest of all coral reefs. The whole stretch of coast is thus safely sheltered, but a number of navigable channels through the reef give access to the ports.

What is the least distance between the reef and the mainland?

Surface-Features.

Mountains and Plains.

Australia possesses no such great mountain masses as are found in Canada and India. The highest land is near the east coast where a series of mountain ranges rise abruptly from the sea and form an almost unbroken line from north to south. The greatest heights are reached in the south, where Mt Townsend in the Australian Alps rises to over 7000 feet.

How does this height compare with that of Ben Nevis?

The greater part of the interior is a plateau separated from the shores by narrow coastal plains. From the outer rim of this plateau there is a gradual downward slope towards the interior, and the lowest levels are reached in the S.E. plains which form the only low-lying region of any considerable area.

Using the Map draw a section across the continent in lat. 30° S.

Tasmania is almost entirely mountainous and contains several peaks which rise to over 4000 feet.

Rivers and Lakes.

An examination of the Map gives the impression that Australia is well supplied with rivers except on the Western Plateau. This however is not the case. As the mountains are of no great height there are no glaciers nor any permanent supply of snow to feed the streams. The rivers therefore are entirely dependent on the rainfall, and this we shall find to be irregular. It is heaviest on the east coast, which is the windward side of the mountains, and here the rivers are most numerous, but too short and rapid to be of much value.

On the leeward side, however, the water supply is so scanty and the evaporation of moisture so great that the rivers are only full after heavy rains, and very few succeed in reaching the sea. Some find their way into one or other of the numerous lakes of the interior, but many are ultimately absorbed by the soil and disappear underground.

The most extensive river-system is the Murray, with its tributaries Darling and Murrumbidgee. The Murray rises among mountains where snow lies in winter, and for this reason it is the only Australian river to maintain a continuous flow throughout the summer, during which period its tributaries are partially dried up. The length of the Murray is about 1300 miles, and that of the Darling considerably more, but after reaching the plains these rivers receive less water than they lose by evaporation, so that the volume discharged into the sea is not sufficient to prevent the formation of large sandbanks at the mouth. They have, therefore, little value as commercial highways, though the upper parts are used by small steamers for local traffic, but for irrigation purposes they are important, and moreover in times of flood they enrich with alluvial deposit large tracts of the surrounding plain. That the absence of navigable waterways and the regularity of coast-line are a great handicap to the country will be realised by recalling the immense advantage that Canada enjoys in these respects.

Lakes. Australia contains a great number of lakes, but many of them are dry except after periods of heavy rain. Even the largest, Lake Eyre, with an area of nearly 3000 sq. miles, is occasionally dry in times of drought.

Climate.

In the first place you must remember that Australia is in the S. Hemisphere, and consequently its summer coincides with our winter and *vice versa*. In what follows, the seasons mentioned will be those of Australia.

The climate of the country is largely influenced by the fact that its greatest length lies along the Tropic of Capricorn upon which the sun shines directly in summer. Very high temperatures are therefore experienced, particularly in the central region where the moderating influence of the sea is not felt.

Temperature.

In summer the N. part of the W. Plateau has an average temperature of over 90°, and the thermometer often stands at over 100° for days continuously. Farther

south the temperature diminishes, though there are few parts where it falls below 70° , and nearly everywhere the heat is less oppressive than might be expected, because there is so little moisture in the air.

In winter, when the effect of the sun is most powerful in the N. Hemisphere (cf. India), temperature varies with latitude and diminishes from N. to S. Notice the winter isotherms on the isothermal map.

Thus we see that the north is always hot, and its climate is trying to white people; southwards the temperature becomes less and less tropical till in the far south (Tasmania) it is very similar to that of the British Isles.

Rainfall.

As Australia is surrounded by sea, the rainfall will be heaviest in the coast regions upon which prevailing winds are blowing from the sea, and will diminish in the interior with distance from the windward coast.

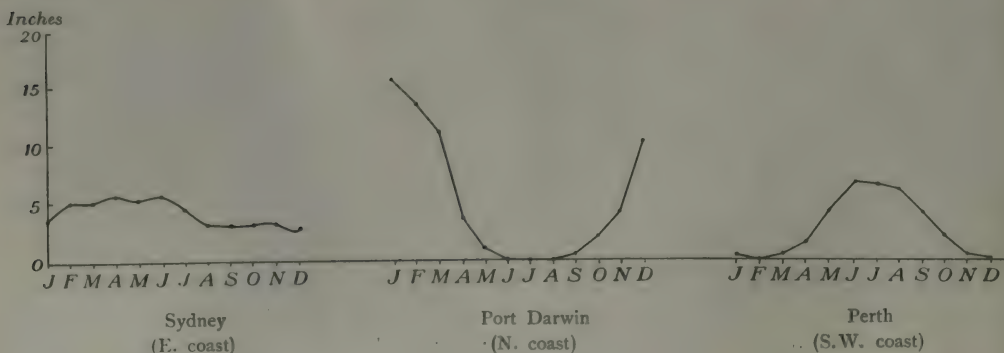
The continent lies mainly in the belt of the S.E. trades, but the north and south parts are subject to other winds at certain seasons. Thus only the E. coast has the same prevailing wind throughout the year, and, as in addition there is high land near the coast, the rainfall here is considerable at all seasons.

On the other hand the north and the south parts only get rain during the time when the usual S.E. wind is replaced by a wind from another quarter. Remembering the cause of the Indian S.W. Monsoon, you can realise why a wind of a similar nature reaches the N. parts of Australia during its summer months, bringing very heavy rainfall. Thus Port Darwin on the N. coast has a greater rainfall than Sydney on the E. coast. (cf. graphs).

Again in winter the westerly winds extend far enough north to reach the southern parts and supply them with a fairly heavy fall.

To sum up: the east has rain at all seasons,
 the north has most in summer,
 the south has most in winter,
 the centre receives little at any time, and thus a considerable area
 has less than $10''$ a year.

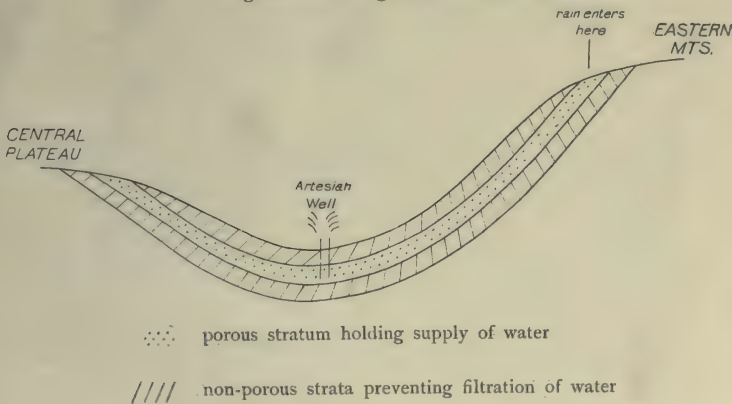
Examine carefully the graphs and the rainfall map, and you can verify all these facts.



On account of this uneven distribution of rainfall, Australia is faced with the same "drought problem" as India, but she is less well equipped by nature for the struggle. Apart from the Murray-Darling system, there are no great snow-fed rivers on the scale of those in India, and **artesian wells** offer the only chance of providing the water necessary for stock-raising or for the irrigation of agricultural land. Here, however, the configuration and geological formation of the continent are helpful.

Boring operations have shown that immense supplies of water lie between non-porous strata below the surface at depths varying from a few feet to nearly a mile, and where these strata lie in the form of a basin, the water, when tapped by pipes, rises to the surface by natural pressure. This water supply is the more valuable in that it exists on the leeward side of the eastern mountains where the rainfall is insufficient. In different parts of the country there are hundreds of these wells, many yielding as much as a million gallons a day, and their value to the farmer may be judged from the fact that in Western Queensland alone a tract of country larger than the British Isles obtains a supply of artesian water equivalent to 12 inches of rain every year. Moreover, successful experiments in New South Wales and Victoria show that the "drought problem" will be considerably lessened when the various irrigation schemes now on foot have been fully developed.

Diagram illustrating an Artesian Well



Settlement and Progress.

Though Englishmen were not the earliest discoverers of the continent, the most important part of it was first made known by Captain Cook who landed on the east coast in 1770. The first English settlement was made at Botany Bay in 1788, but as it was used by the British Government as their chief convict station, it offered few attractions for colonists who were looking for a desirable home. Moreover, the settlers found themselves shut off from the interior by the eastern mountain ranges, and thus little headway was made till this barrier was penetrated for the first time in 1813.

During the next 30 years exploring expeditions gradually paved the way for settlements north, south, and west, and though much of the waterless interior is still unexplored, the more valuable parts of the continent have long been fairly well known.

The development of the country has proceeded on much the same lines as that of Canada. During early days agriculture was the only interest, but so much of the land required clearing before crops could be grown and the settlers were so few for the work, that stock-raising appeared then to be more profitable and has since developed into the mainstay of the country.

Till the middle of last century agriculture remained without a rival and the settlement of the country advanced slowly, but in 1850 the first discoveries of gold were made and caused an inrush of immigrants from all parts of the world. For the moment, the universal rush to the goldfields made it difficult for farmers to obtain labourers and agricultural development was seriously checked, but after the first excitement had subsided, the growth of a large mining population created a greater demand for agricultural produce than before and the increase of cultivated areas has from that time been most marked. But even now only a small proportion of the agricultural land available is being used and there is ample room for immigrants.

In W. Australia and Queensland free grants of land are made, and the other states make matters easy for the settler by allowing him to spread the payment for the land he takes up over a reasonable number of years. Immigration figures, which for long were disappointing, have increased remarkably of late, the number of British immigrants alone in 1912 totalling nearly 100,000. Australia and Canada both have great attractions for intending emigrants from the Old World: though Canada is much nearer, it must not be forgotten that in Australia severe winters are unknown and agricultural work may be pursued in the open all the year round.

Resources.

Agriculture.

Though the mines have played an important part in her history, Australia is still mainly agricultural. Fine pasture-lands exist in nearly all parts of the country except the desert and the lowlands north of Capricorn, and the success of the pastoral industry is largely due to the care taken to breed only the best kinds of stock. In the early days **sheep** of the merino type were introduced as being the best wool-producers. There are to-day nearly as many sheep in Australia as in the whole of the rest of the Empire, and the value of the wool and sheepskins exported in 1911 was nearly £30,000,000. Besides, in recent years, with the increased facilities for cold storage in vessels, a very large export of frozen mutton has been developed. The trade in wool, meat, and skins is chiefly with the British Isles.

Large numbers also of **horses** and **cattle** are reared. The former are mostly exported for military requirements, particularly to India. Cattle-farmers, in addition to satisfying home demands, export chilled beef in considerable quantities chiefly to the British Isles and South Africa. But of greater importance is the dairying industry.



A sheep farm, New South Wales



Sheep-shearing in Queensland

Between thirty and forty thousand tons of butter of high quality, produced under State supervision, are shipped annually, and as the heavy summer output arrives in the British Isles during our winter, when butter is scarce, it finds a very profitable market.

In considering the crops you must remember that the range of latitude is considerable and that Australia does not lie entirely in one zone. Of the Temperate crops the most important is **wheat**, which is grown in nearly all parts of the country which lie outside the Tropics. This is of excellent quality and realises the highest price in the English market, to which much of it is sent. **Barley**, **oats**, and **maize** are also grown in small quantities, but all these are of less value than the **hay** crop which is next in importance to wheat. In this country the hay crop is composed entirely of various grasses, but in Australia cereals, such as wheat and oats, are grown for fodder rather than for grain if the price of hay in any year guarantees a higher profit.



Timber forest, Western Australia

Temperate or sub-tropical fruits include the **vine**, which from the time of the earliest settlements has been cultivated in Victoria and South Australia, **oranges** and **lemons** in the south, and **apples** of particular excellence in Tasmania.

North of Capricorn, under tropical conditions of climate, there is considerable cultivation of the **sugar-cane**, but the employment of white men at high wages makes it difficult for the Queensland sugar-growers to compete with other tropical countries where black labour is employed at a very low wage.

As the soil and climate are eminently suitable for their growth, the cultivation of cotton and tobacco, hitherto in the experimental stage, will later on probably be profitable. Many varieties of fruits, such as the banana and pine-apple, are also grown.

Timber. A belt of forests exists round the coasts where the rainfall is plentiful, particularly along the slopes of the eastern mountains and in the south-west. These

forests are of great value and each state has a special department whose duty it is to prevent unnecessary waste and to renew the plantations. The most important trees are gums of the eucalyptus species. Of these there are several varieties, mostly very hard, of great strength, and much in demand for railway sleepers, wood-paving, and piles for piers. From the leaves of some is obtained the eucalyptus oil used for medicinal purposes, while others provide bark suitable for tanning. Other valuable trees are sandalwood (W. Australia), red cedar, rosewood and blackwood, all of which are used for furniture and cabinet-making.

Minerals.

Among the minerals **gold** stands easily first. The important discoveries of 1850 were made in Victoria near **Ballarat**, but now gold is mined in all the states, and the value of the output is over £10,000,000 a year, the only countries with a greater production being South Africa and the United States. The most productive states are Western Australia and Victoria. In the former **Coolgardie** and **Kalgoorlie** are centres of an immensely rich district, but being on the edge of the desert were at first much handicapped by the shortage of water. This was remedied by the Government of the State which at enormous cost has laid a water-main 400 miles long to the goldfields from one of the rivers near the coast.

At first, supplies of gold were obtained from the beds of streams and stretches of alluvial deposit, from which the metal was abstracted by washing away the gravel and sand in which it was found. Some is still procured in this way, but the greater part is now obtained from quartz reefs containing veins of gold: this is crushed by machinery and passed over troughs filled with mercury which retains most of the gold, while the quartz "tailings" are carried off and subjected to further treatment.

Good **coal** is mined in New South Wales (**Newcastle**) and the southern part of Queensland (**Ipswich**). The former state supplies by far the larger amount, but although the coalfields are extensive the output is at present small.

Silver, copper, zinc and tin are also found in large quantities and are a source of considerable wealth to the country. The famous **Broken Hill** district of New South Wales is the chief centre of silver production and one of the richest mining districts in the world.

But the full extent of Australia's mineral wealth is not yet known. Mining districts have been opened up one after another as the exploration of the interior proceeded, and judging from the history of the last 50 years there would seem to be splendid prospects for the future of the mining industry.

In the map of Australia on the following page insert the agricultural and mineral districts, thus:

Wheat	...	...	W.	Coal	...	...
Vine	...	...	V.	Gold	...	...
Sugar	...	...	S.				

Industrial Occupations.

The small population of Australia, her insignificant output of coal, and the great success which has attended her pastoral and agricultural occupations have combined to

prevent the establishment of manufacturing industries on any large scale. The isolated position of the continent made it necessary to start factories connected with the production of food, but the rush to the goldfields quickly exhausted the supply of labour and practically put a stop to these industries. Later, when the wants of the mines were fully supplied, many of the men returned to the larger towns and work at the factories was resumed. There is now a considerable manufacture of woollen goods and agricultural implements, while other important industries include tanning, butter-making, and flour-milling.

With a larger population and greater development of the coalfields Australia may take a more prominent position as a manufacturing country, but for some time her imports of manufactured goods must greatly exceed her exports.



Population and Towns.

Examine the map in the Atlas which shows the density of population.

In what respect is the distribution of the population of Australia like that of Canada and unlike that of the British Isles?

Notice the regions where the population is densest. Then examine those same regions on the vegetation and rainfall maps.

What do you gather from these two maps as to the causes of the distribution of the people in Australia?

The total population of the continent is about 5,000,000.

How much larger than the British Isles is Australia, and how much smaller is her population than ours? What is the average number of people to the square mile in Australia?

The most thickly populated parts are in the east and south-east, where the climate is suitable for agriculture and most congenial to white people. Much of the available land in this part of the country has already been taken up, and the inner belts are being made more productive by irrigation and more accessible by railways, with the result that the population is spreading more than ever before in the history of the continent. But, till lately, the tendency has been for the people to concentrate in parts which are already well populated. Here are found all the largest towns, and this concentration of people in one region explains why the capitals of the states are so much larger than you would expect in an agricultural country. In each state the population of the capital far outnumbers that of any other town in it, and in some states the capital is the only town of any considerable size. Apart from four cities with populations ranging from 100,000 to over half a million, there are only two or three towns with as many as 50,000 inhabitants. The aboriginal natives number less than 100,000 and as the settlement of the country advances they are slowly dying out.

Though Australia is badly in need of immigrants, the Government has set its face against the admission of coloured peoples. Australia is to be preserved as a white man's country. Chinese, Malays, and other Asiatics (who have helped by their cheap labour to develop the country, especially the tropical parts) are not allowed to enter except under a tax so heavy as to be almost prohibitive: even the small number of Kanakas (Pacific Islanders), who were imported into Queensland years ago, are being sent back to their homes as fast as possible. Judging from the profitable working of many sugar plantations in different states, the future may show that, under carefully considered health regulations, white labour can safely be employed even in tropical countries.

Towns of Queensland.

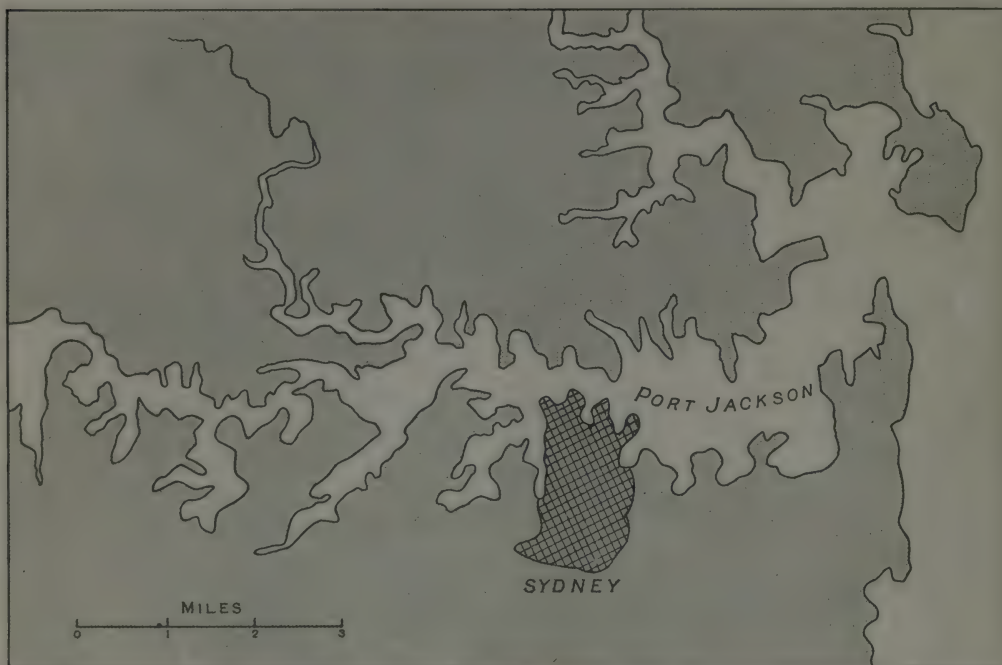
Brisbane (141, cf. Sunderland), the capital and chief port of the state, is situated on the river Brisbane about 20 miles from its mouth. The river has been made navigable for ocean-going vessels by dredging, and a considerable amount of coastal shipping enters the port. In addition to the export of much agricultural produce, many manufacturing industries exist in the town, especially boot and soap-making, brewing and tanning. Plentiful supplies of coal are obtained from the district round **Ipswich** which is the chief centre of the Queensland coalfields and is also a manufacturing town.

Rockhampton (21) is the second port of the state and is the starting-point of a railway which runs inland for over 400 miles. Near it is the gold-mining town of Mt Morgan where is situated one of the most famous gold-mines in the world.

Towns of New South Wales.

The first English settlement in Australia was at Botany Bay, but as this was found to be an unsuitable site, it was abandoned in favour of Port Jackson. This great fiord,

with its irregular outline and deep water close inshore, is said to be the finest harbour in the world. Situated on its southern shore amongst beautiful surroundings is **Sydney** (640, cf. Liverpool), the leading port and largest city of the continent. Besides being the main outlet of the state, it has become, by reason of the coal supplies of the neighbourhood, a busy manufacturing centre with large cloth-mills and iron-foundries.



Position of Sydney

Newcastle (65, cf. Barrow), standing at the mouth of the Hunter river on the seaward edge of the coalfields, supplies coal to the other states and to countries in the Far East. It has a share also in the large export of wool and frozen meat.

At the head of Port Jackson, **Parramatta** (13) is surrounded by a rich fruit-growing district. Farther west **Bathurst** (9), in early days an important gold-mining town, has since become the agricultural centre of the fertile plains surrounding it, which are especially suited to the growing of wheat and other cereals.

Broken Hill (31), near the South Australian border, lies in the midst of an extensive pastoral country, but owes its rapid development to its rich silver-mines.

Towns of Victoria.

Melbourne (591), the capital of the state and the temporary capital of the Commonwealth, lies at the head of the magnificent harbour of Port Phillip. Originally founded as an outlet for the gold-mines of Victoria, its growth has been greatly assisted by the pastoral wealth of the state. Excellent accommodation has been provided for the

freezing of meat and butter which are exported in increasing quantities. A large amount of wool is also shipped from Melbourne, and the city is making rapid progress in the manufacture of woollen goods and butter.



Position of Melbourne

Geelong (28), a busy port on the western side of Port Phillip, contains many woollen factories as well as tanneries.

Ballarat (44) and **Bendigo** (42) are the chief centres of the Victorian goldfields. Ballarat is also an important railway junction and possesses woollen and flour mills.

Towns of South Australia.

A great part of this state is uninhabitable, but in the south is a rich agricultural district which contains the bulk of the population.

Adelaide (192, cf. Cardiff), the capital, is situated at the mouth of a small river running into St Vincent Gulf, and is the terminus of the railway which connects it with Melbourne, Sydney, Brisbane and Rockhampton. It is also the starting-point of the overland telegraph which runs to Port Darwin on the north coast and is there connected with the cable to England *via* Singapore. The town contains several saw and flour mills.

Port Pirie (12), on Spencer Gulf, is the outlet of the Broken Hill mines and has smelting works. Much of the South Australian wheat is shipped from this port.

The only other habitable part of the state is the extreme north, but the climate is very trying and the population small, although much valuable land exists. The principal town of the Northern Territory is **Palmerston** on Port Darwin.

Towns of Western Australia.

Perth (84), the capital, owes its prosperity to the rich goldfields which during the last 20 years have been discovered in the state. The city lies 12 miles from the mouth of the Swan river and is in regular communication by rail and river with **Fremantle** (20), which is the first port of call in Australia for mail steamers from Europe. From Fremantle the railway runs through Perth to the goldfields of **Kalgoorlie** and **Coolgardie** which have already been mentioned (see page 109).

Western Australia has an area of almost a million square miles and a population of about a quarter of a million. It is thus the largest state, and, with the exception of Tasmania, has the fewest inhabitants. *Why is this?*

Towns of Tasmania.

Although Tasmania is nearly the size of Ireland, its population is only equal to that of Cardiff. The principal occupations are sheep farming and fruit growing, and the



Sorting and packing apples for export

island has considerable wealth in minerals, which have not as yet been worked on a very large scale. Plentiful supplies of water-power are available and manufacturing industries are increasing.

The capital is **Hobart** (38) on the estuary of the Derwent in the south of the island. Beautifully situated at the foot of Mt Wellington (4000 feet) it has a good harbour and is a port of call for lines of steamers from England to New Zealand. Owing to its favourable climate it is frequented in the summer months by visitors from Sydney, Melbourne and Adelaide, with which there is regular communication. The industries of the town include brewing, tanning, flour-mills, and jam-factories.

The chief town of the north is **Launceston** (24) lying in a valley surrounded by hills at the head of the Tamar estuary. The town contains large tin-smelting works and is the centre of an important fruit-growing district.

Railway Communications.

The development of a country so ill-provided with navigable waterways as Australia is essentially dependent upon the construction of railways. Yet although the first line was built in 1855, for the next 20 years very little more was done, and at the end of that period only some 1000 miles of railway were in existence. This was no doubt due partly to the small numbers of the population and a fear that the expense incurred would not be justified, and partly to natural obstacles presented by the mountain ranges in those parts of the country where lines were most needed. During the latter half of the 19th century, however, considerable progress was made in railway construction, and now the lines actually completed have a total length of over 16,000 miles. In the east, south-east and south there is through connection between Rockhampton and Adelaide, and numerous branches have been constructed to open up fresh agricultural districts and enable them to find an outlet for their produce.

In Western Australia the same principle has guided the construction of railways, so that the mining districts and the grazing or cultivated lands are in touch with the seaports.

Unfortunately from the point of view of through communication each state built its own section of the railway system and no uniform gauge was adopted. The result now is that goods sent from Brisbane to Melbourne have to be discharged and reloaded at the boundary between Queensland and New South Wales, and again on passing into Victoria. A portion of the South Australian track is of the same gauge as that of Victoria, so that no change is necessary between Melbourne and Adelaide; moreover, there is now on foot a scheme to make the main lines of the same gauge in all states. Apart from commercial disadvantages arising from this difference of gauge, military considerations, such as the transport of troops in case of war, demand that this serious error should be rectified.

Although there are still immense areas which await development, in recent years many tracts of country have been opened up for settlement by the extension of the railway system: in particular, a line to connect W. Australia with Adelaide is now under construction and should be completed by 1916. The route of another trans-continental line, joining Adelaide with Palmerston, has been surveyed, but at present nothing definite has been decided as to the building of it.

Either of these lines, about 1200 miles in length, would considerably shorten the time occupied by passengers from London to Sydney or Melbourne.

Form of Government.

In 1901 the six states of Australia were united under a single Commonwealth Government, at the head of which is a Governor-General appointed by the King and assisted by an Executive Council. Parliament consists of two Houses, the Senate and the House of Representatives, which correspond to our Houses of Lords and Commons except that they are both elected by the vote of the people. Each state is represented in the Senate by six members, and in the House of Representatives by a number which

depends on the population of the state. Consequently two-thirds of this House consists of members from the thickly populated states of New South Wales and Victoria.

The Commonwealth Parliament has charge of the interests of the country as a whole, while each state has its own Governor and Parliament for managing its own affairs.

Canberra, the new capital of the Commonwealth, is being built in the Yass-Canberra district in the S.E. of New South Wales, and in the meantime the government of the country is administered from Melbourne.

NEW ZEALAND.

New Zealand consists of three main islands, North Island, South Island and Stewart Island, with groups of smaller islands which belong to the colony. It is situated in the S. Pacific Ocean about 1200 miles east of Australia, and is very nearly the antipodes of the British Isles.

What would be the latitude and longitude of the antipodes of London?

What islands do you find near this position on the Map of the World?

Between what parallels does New Zealand lie? What is the longitude of the most easterly point?

The area of New Zealand is about 100,000 sq. miles, or a little larger than that of Great Britain. Of this area the North Island contains rather less and the South Island rather more than half, while Stewart Island is only about 600 sq. miles. Measure the lengths of the two large islands and compare with that of Great Britain. Notice the name and breadth of the strait which separates them.

The coast-line is mostly regular except that of the south-west of South Island which affords a splendid example of a typical fiord coast (cf. S.W. of Ireland). The harbours of this coast contain great depth of water, but, being backed by a lofty mountain range and thus cut off from the interior of the country, are of no commercial value. All the coasts are swept by strong currents which tend to give them a regular formation, and create bars at the river mouths.

Surface-Features.

Mountain ranges run through the islands from north to south and many are of volcanic origin, but nearly all the volcanoes are now extinct. The highest peaks are found in South Island, where Mt Cook in the Southern Alps rises to 12,000 feet and is capped with perpetual snow. These mountains cover the greater part of the island, and the only plains occur in the east and extreme south. The volcanic area is mostly in North Island and contains a number of geysers and hot springs.

The narrowness of the islands and the height of the mountains result in the rivers being short and rapid. The two largest are the Waikato in North Island and the Clutha in South Island, but all the rivers are liable to floods and are useless for navigation.

The islands contain numerous lakes, the largest being Lake Taupo in North Island with an area of about 200 sq. miles. The lakes of South Island are found in narrow valleys amongst the mountains, and in the beauty of their scenery resemble the lochs of Scotland.

Climate.

N.B. The seasons correspond with those of Australia.

The shape of the country and its position in a large ocean give New Zealand a distinctly maritime climate.

In what zone does it lie? What is the direction of the prevailing winds in these latitudes? (Cf. British Isles.)

The isothermal map shows that the range of temperature is about the same as that of the British Isles, although the shorter distance from the equator makes the actual temperature rather higher in New Zealand.

Remembering that the prevailing wind is similar to that of the British Isles, and that the mountains are also nearer the west coast, you will infer that the distribution of rainfall is similar to that in this country, but the greater height of the mountains and the slightly higher temperature in New Zealand cause the rainfall figures to be somewhat the larger (see the rainfall map).

To sum up, we notice that the British Isles and New Zealand are somewhat similar as regards shape, surface-features, zone, and direction of wind from off a large ocean. We therefore conclude that the range of temperature and distribution of rainfall will be approximately the same in the two countries.

Occupations.

Agriculture.

New Zealand, like Australia, derives most of its wealth from the breeding of **sheep**. The climate is particularly favourable to this industry, and the volcanic nature of the soil produces a pasture of excellent quality. Wool has always been the leading export, although the sheep are bred as much for meat as for wool, and New Zealand does a far larger trade in frozen meat than Australia. The Canterbury plain in South Island is the chief sheep-breeding district, and produces the well-known Canterbury lamb which is so largely consumed in this country. The value of the wool and frozen meat now exported from New Zealand is about £12,000,000 annually. Cattle are reared in many parts of the islands and the export of dairy produce (butter and cheese) is considerable. Small quantities of cereals, chiefly wheat and oats, are grown to supply the wants of the country.

Timber is a source of considerable wealth and has been exported in increasing quantities during recent years. When the first European settlers were established in the islands less than 100 years ago they found that thick forests covered a large portion of the country, and much of the timber was destroyed to clear the ground for other purposes. The most valuable wood is that of the kauri, which on account of its durable nature is in great demand for ship and house building. It is found mostly in

the Auckland district of North Island. From this tree is obtained a resin, known commercially as kauri gum, and used for the making of varnish.

Minerals.

Of the many minerals which are mined in New Zealand the most important are gold and coal.

Gold was discovered in the country in the middle of the last century, shortly after its presence in Australia was first noticed. The most productive goldfields are in the N. part of North Island and in the S.E. corner of South Island, and the value of the output is about £2,000,000 annually.

The best **coal** is found on the west coast of South Island and has proved to be excellent steam coal.

With a small population engrossed almost entirely in pastoral industries the manufactures of the country are unimportant, and do no more than help to provide for the wants of the people.

With a larger population, the plentiful supply of coal and an unlimited amount of water-power provided by the rapidity of the rivers should enable New Zealand to manufacture much of the raw material which is now exported from the country.

Population and Towns.

The total population of the country is now just over a million, exclusive of the Maori natives who number about 50,000. The Maoris are a particularly fine race compared with the aboriginal natives of Australia. They are strong, brave and intelligent enough to send representatives to the New Zealand parliament.

The white population is unevenly distributed owing to the arrangement of the surface-features. In North Island the N. part is most thickly populated, while in South Island more than three-quarters of the inhabitants live along the E. and S.E. coasts.

Although the prosperity of the country largely depends on its power to attract a larger population it is doubtful whether this result is likely to be attained. Nearly all the suitable land has already been taken up, and the remainder requires to be cleared of forest before it can be of any use. To do this much time and labour are necessary, but labour is scarce, and, as in Australia, there is a tendency for new-comers to settle in the larger towns rather than in the country.

Towns of North Island.

The largest city in the whole country is **Auckland** (102, cf. Middlesbrough) which was one of the earliest settlements, and remained the capital until in 1865 the seat of government was removed to Wellington.

The town stands on a narrow isthmus and is beautifully situated on one of the finest harbours in the country, from which there is regular communication with the Australian ports. The principal industries include shipbuilding, paper-making, and saw-mills.

Wellington (70, cf. Grimsby), on an inlet of Cook Strait, has an excellent harbour enclosed by steep hills, and its central position makes it suitable for the government

headquarters. It commands the chief shipping trade of the country, and is also the port of call for lines of steamers from England to New Zealand.

Towns of South Island.

Christchurch (80, cf. Newport), on the Canterbury plain, is surrounded by a wealthy agricultural district, and does a considerable export trade in frozen meat from its harbour at **Port Lyttelton**.

Dunedin (64) is an important commercial town with several woollen factories and meat-freezing works. It was a comparatively small town until 1861 when the discovery of goldfields in the neighbourhood attracted a larger population.

At the southern extremity of the island **Invercargill** (14) is the centre of a rich agricultural district, and exports large quantities of timber, wool and meat. There are also a number of factories in the town including breweries, flour-mills and timber works.

Communications.

In both islands there is a satisfactory railway system connecting the productive districts with the ports, and the big towns with one another. In North Island the main line runs from Auckland to Wellington, while in South Island the more thickly peopled eastern plains are served by a line (with several branches) joining Christchurch and Invercargill. In addition there is every facility for communication by coasting steamers between one district and another.

Form of Government.

The King is represented by a Governor who is assisted by an Executive Council. The Dominion Parliament consists of a Legislative Council and a House of Representatives in which four of the members are Maoris.

Main Lines of Communication between Australasia and the Home Country.

Australasia can be reached from London either by the Eastward or the Westward route.

I. Eastward.

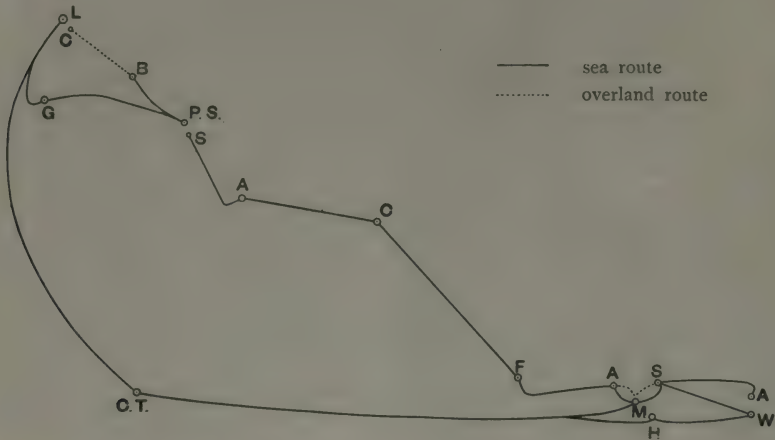
From the diagram you observe there are two routes from London to Sydney—one through the Suez Canal, the other round the Cape. In actual sea distance the Canal route is about 600 miles the shorter and by either way the voyage occupies roughly six weeks: but on the Canal route, 10 days can be saved by travelling overland across Europe to Brindisi and from Adelaide to Sydney.

Travellers to N. Zealand by the Canal route change ship at Melbourne or Sydney and reach either Auckland or Wellington in four days—a distance of about 1250 miles. *Via* the Cape, direct lines of steamers reach Wellington, calling at Hobart, after a voyage lasting between six and seven weeks.

II. Westward.

The fastest route westwards involves the passage across the Atlantic to New York, an overland journey to San Francisco, and a voyage across the Pacific with calls at the Sandwich and Fiji Islands. The journey from London to Sydney by this route occupies about 33 days.

1. Which do you think the more expensive route for a traveller—the eastward or westward, and why?



Lⁿ—S^y 11,800 miles, *via* Canal. [P. & O. Line]

12,400 " " the Cape. [White Star Line to Australia: New Zealand Shipping Co. to Wellington]

2. Does the eastward or westward route offer the more opportunities for trade en route?
 3. What kind of vessel uses the Canal route as opposed to the Cape route?
 4. What route would sailing vessels from Europe adopt to Australasia and back?
- Using the Atlas, identify the ports marked with initials.

BRITISH SOUTH AFRICA.

British South Africa stretches from the Cape of Good Hope to the S. end of Lake Tanganyika. Like Australia it lies partly in the Tropical Zone and partly in the Temperate, the northern limit being in lat. 8° S. and the southern in about lat. 35° S.

The whole region is about twelve times as large as the British Isles and comprises the following: the Provinces of The Cape of Good Hope, Natal, the Orange Free State, and the Transvaal; the Bechuanaland, Swaziland and Basutoland Protectorates; Rhodesia, and Nyasaland (or British Central Africa Protectorate).

How does the area of B.S. Africa compare with those of India, Australia and Canada?

The Coasts.

In the Atlas notice the names of the oceans and the ocean-currents that wash the shores of S. Africa, and explain why one current is warm and the other cold.

Examine the character of the coast-line and compare it with those of India and British Columbia. You will observe that the length of coast-line is not great in proportion to the area of the country, and that the regularity of outline suggests that there are very few natural harbours.

The chief ports are Cape Town, Port Elizabeth, East London, Durban, and Simon's Town in False Bay. Not one is a first-rate harbour: nearly all require much dredging and at best may be described as mere roadsteads made as safe as possible by artificial means. Moreover, all except Cape Town are exposed to the prevailing S.E. trade winds which at times blow with such violence as to make landing a difficult operation.

Thus in the absence of natural harbours, the position of the chief ports has been decided largely by the character and requirements of the hinterland of the coast: e.g. Port Elizabeth, with no natural advantages as a harbour, is important as the outlet of an immense and fertile tract of country, whereas Saldanha Bay, the best natural harbour on the coast, is practically unused on account of an insufficient supply of fresh water and an unproductive hinterland.

[Walfisch Bay, which is included in the Cape Province, has a moderately good harbour, but being cut off by German territory from the British interior is not of much value.]

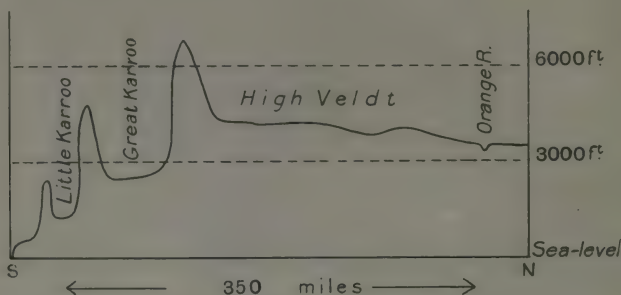
The Surface-Features.

If you compare the physical with the political map, you find that nearly all British S. Africa is more than 3000 feet above sea-level, and occupies a large part of the Great Southern Plateau which is the outstanding feature of the continent south of the equator.

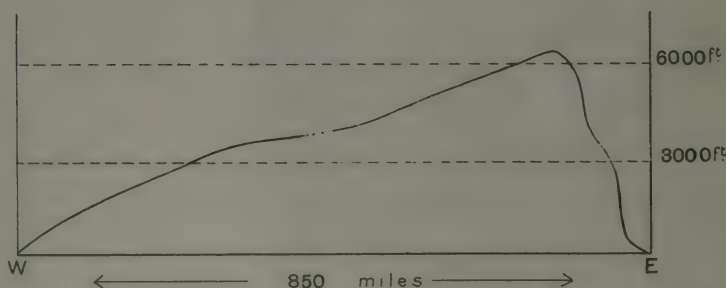
The southern part of this "high veldt" slopes towards the Atlantic, while in the north the slope is towards the Indian Ocean. The south and east edges of the plateau

are marked by a high ridge of mountains which run from S.W. to N.E. as far as the Limpopo River and reach a maximum height of more than 10,000 feet in the Drakensberg range. From this ridge there is a sharp descent by terraces (called in the Cape Province the Great and the Little Karroo) to the coastal plain which is narrow everywhere except north of the Limpopo. The following sections show the contour of the country from the coasts to the interior of the plateau.

N. & S. Section from Mossel Bay to the Orange River.



E. & W. Section from Durban to Port Nolloth.



Rivers.

The largest river is the Zambesi which rises in the western part of the plateau and flows for more than 2000 miles before entering the Indian Ocean. At the mouth is a delta consisting mostly of mangrove swamps or very low land covered with dense tropical undergrowth. The chief feature of the river is presented by the Victoria Falls: here the river—a mile wide—plunges over a precipice more than 400 feet high, then enters a gorge which narrows in places to less than 100 yards, and flows for 40 miles between walls which are from four to six hundred feet high. After emerging into the coastal plain the river attains a maximum width of three to five miles.

The only other large river flowing eastwards is the Limpopo, which for many miles forms the northern boundary of the Transvaal and you will notice that its lower course, like that of the Zambesi, is in Portuguese territory.

To what extent is it a commercial disadvantage when a country owns the upper course of a river but not the lower?

Numerous smaller rivers rising on the seaward slopes of the mountain ridge rush rapidly down to the E. and S. coasts, but flowing westwards there is only one river, the

Orange, which, in spite of its length, is quite unimportant except, perhaps, as a boundary: with its tributary, the Vaal, it practically encloses the Orange Free State, and its lower course separates the Cape Province from German S.W. Africa.

From the point of view of usefulness, the S. African rivers are generally inferior.

Firstly, they are of little use for irrigation (the great need of the country), because many disappear partially or entirely in the dry season, and in most cases their valleys have been grooved so deeply in the land that it is difficult to raise water from their beds up to the level of the surrounding country. The steepness of their banks, too, makes them serious obstacles to traffic, as bullock-wagons—the chief means of inland



A South African drift

transport—can only cross at “drifts” (fords), where there are in the banks on both sides either natural or artificial openings.

Secondly, very few of them are of any value as waterways. All the streams flowing east and south have short and rapid courses and their estuaries are blocked by bars. Of the larger rivers the Orange is so broken by cataracts and so rapid as to be quite useless, and the Limpopo is navigable only for a few miles from its mouth. Even on the mighty Zambesi navigation is obstructed at several points and is generally difficult owing to the pace of the current. Steamers of light draught can enter by the Chinde mouth and proceed for more than 300 miles till stopped by the rapids near

Tete: thence there is a clear stretch of 700 miles before the Victoria Falls bar further progress, and above the Falls the river is again navigable nearly to its source.

Under what circumstances do you think it would be worth while to construct canals to make navigation on the Zambesi continuous, as you know has been done in the case of the St Lawrence and Great Lakes?

Lakes.

All the lakes of importance lie far to the north. Only Lake Bangweolo is entirely in British territory, but Lakes Tanganyika, Nyasa and the Mweru salt swamp all touch N.E. Rhodesia. Of these, Bangweolo and Mweru are quite shallow and swell or contract with wet or dry seasons respectively. On the other hand Tanganyika and Nyasa are deep and there is some steamer traffic on both, but Tanganyika is unfortunately without any navigable outlet: in the case of Nyasa, there would be through communication by water with the mouth of the Zambesi but for a stretch of 60 miles of rapids on the Shire river.

Climate.

Our knowledge of the climate of the whole of B.S. Africa is not completely accurate, because much of the interior has been only so recently settled that records of temperature and rainfall have not been kept long enough. The main features, however, are fairly well understood. In many respects the influences that control the climate of South Africa are the same as those you have met with in Australia.

What is the position of Capricorn?

What is the range of latitude?

What are the prevailing winds?

What is the position of the higher mountains?

Roughly speaking, the S.E. region resembles Queensland, the S.W. can be compared with Victoria, and the Kalahari Desert occupies a position similar to that of the Great Victoria Desert. It is only when we come to examine the interior of S. Africa that we find great differences.

Temperature.

(a) As the prevailing winds are off the ocean, the range of temperature in the windward coast regions is small, but it increases in the interior in proportion to the distance from the sea: *e.g.*

		Mid-winter				Mid-summer				
Durban	...	52° F.	...	...	...	84°	—	range	32°	
Kimberley	...	37° F.	...	...	...	93°	—	„	56°	

In addition to this contrast between coasts and interior, there is also some difference between the E. and W. coasts due to the character of the ocean current on each side: *e.g.* the mean annual average at Durban is 72° F. but at Cape Town, 62° F.

(b) The latitude of the country suggests considerable heat, especially in the summer, [*What are the mid-summer and mid-winter months?*] and on the isothermal map you see how large an area the isotherm of 90° F. encloses in summer, and how small a part of the country has a temperature below 60° F. in winter. [Compare this with the

average of the hottest summer month in the British Isles.] But you know that isotherm maps may be misleading unless you take elevation into account. Now the average height above sea-level of the interior plateau is such that you must deduct about 13° F. from each isotherm figure in the map in order to find the actual temperature, and then it becomes clear that the temperature of the interior is in reality distinctly low for the latitude.

Rainfall.

The direction of the prevailing winds and the position of the highest land are, as usual, the chief factors in the distribution. The S.E. trades in summer bring heavy rain to the windward coast regions as far inland as the rim of high mountains on the E. edge of the Plateau, and this rainfall is rendered heavier by the warmth of the ocean current on the E. side which enables the winds to pick up an immense amount of moisture.

The Plateau region inland (particularly the E. part) is generally well enough watered for agricultural purposes by the heavy summer rains and occasional thunderstorms at other seasons which form underground reservoirs of water whence the many springs and streams are supplied: but to leeward of the high mountains the rainfall diminishes westwards till, on reaching the Kalahari district, the winds are so dry as to create desert conditions. Examine the following figures for places from E. to W. in the same latitude:

Average rainfall at Durban—42 inches.

 " " on E. side of Plateau—30 inches.

 " " in Namaqualand—4 inches.

On the rainfall map it appears that the greater part of S. Africa has more rain in January than July: of what part of the country is this not true?

In what part of Australia is there a similar case? Can you give the reason for it?

To sum up, there are in S. Africa two distinct types of climate: the division between them is marked not so much by latitude as by difference of elevation. The "maritime" climate of the coast-lands, whether N. or S. of Capricorn, is tropical; while the "continental" climate of the interior plateau is temperate in spite of latitude. It is precisely this last fact that makes B.S. Africa so suitable for settlement by Europeans and there is no climatic reason why the British should not develop the newer countries of the interior as successfully as other white man's lands like Canada.

Distance.

Though B.S. Africa is not so large as Canada, India or Australia, yet by comparison with the British Isles the distances with which we have to deal are immense. The length of the country from N. to S. is greater than its breadth: from Cape Agulhas in a bee-line to the farthest N. point of N.E. Rhodesia is about 2000 miles, and the average breadth from E. to W. is about 800 miles.

Compare the former figure with the length of India from N. to S., and the latter with the breadth of Australia from E. to W.

Find the distance from Port Elizabeth to Cape Town, Durban and Pretoria. Compare the first two with the distance from Galway to Saltfleet in the British Isles and the last with that from Lyme Bay to Duncansbay Head.

The Growth of British South Africa.

It is now time to consider how we have acquired our possessions in S. Africa.

In the time of Cromwell a settlement was established in Table Bay by the Dutch, who used it as a port of call for their East Indiamen but made little effort to colonise the interior. Recognising its importance as a half-way *depôt* for our own traders to India and the East, we took it from the Dutch at the time when they were in alliance with Napoleon, and since 1815 the Cape has been permanently British. Our first connection, therefore, with S. Africa dates from about a hundred years ago.

Before long, the Dutch settlers, disliking British rule, "trekked" further afield, at first into Natal: but the annexation of this country by the British in 1843 caused them to move once more into the Orange Free State, and later into the Transvaal. But again Britain, following in their wake, annexed the Orange Free State in the "fifties"



and the Transvaal in the "seventies," though both were restored to their Boer owners in 1881. As a result of the last Boer War (1899—1902) the two States again lost their independence and are now merged in B.S. Africa.

But the most rapid growth of British influence has taken place during the last thirty years. As soon as it became known that vast stretches of the interior plateau were habitable by Europeans, there sprang up a keen competition for this territory among the peoples already settled around it. If you compare the diagram with the Atlas you will see the respective positions of the British, Germans and Portuguese. Each of the three wanted room for expansion (*What is there about the character of German S.W. Africa that made the Germans want room most?*) and the nation that first seized the coveted land would not only prevent the expansion of the other two, but would also be able to link up its possessions on either side, hitherto widely separated.

Fortunately there was at that time in South Africa an Englishman whose statesmanlike foresight, energy and ability entitle him to take a high place among our

most successful builders of Empire—Cecil Rhodes. Suspecting that both Germans and Portuguese were contemplating a similar step, and determined to be first in the field, Rhodes persuaded the Government to annex Bechuanaland, and treaties with native chiefs gave us a Protectorate over this gateway to the regions still further north. Not content with this, in 1889 he was chiefly instrumental in obtaining for the B.S.A. Chartered Co. a charter to acquire and govern the districts between the Bechuanaland Protectorate and Nyasaland. An advance into Matabeleland was made in 1890 and since that year, in spite of two wars with the natives, troubles with rinderpest and locust-plagues, and finally the Boer War of 1899, the progress of Rhodesia has been remarkably steady.

Lastly, in addition to the fact that the country is in itself very valuable, the possession of it makes it possible to realize some day Rhodes' dream of connecting our possessions in the south of the continent with the regions in the north which are under our management: and the Atlas shows what progress has already been made with the Cape to Cairo Railway and how much remains to be done.

Resources.

Minerals.

You will remember how for many years Canada was almost entirely dependent upon agriculture for her advance in prosperity, and how that only recently has the discovery of the useful minerals—coal and iron—suggested the possibility that she may some day become one of the chief industrial countries of the world.

Up to a certain point the history of the development of S. Africa has been somewhat similar. For the first 70 years of last century agriculture was practically the only occupation of the inhabitants. Then suddenly came the discovery of minerals, of such value and in such quantity as to alter the whole course of the country's history. But in contrast to Canada the minerals were of the "precious" and not the "useful" type. Yet the possession of precious minerals, provided that there is a sufficient quantity, is of enormous assistance in developing a country. The fascination of diamonds and gold attracts a population perhaps more quickly than coalfields, and though it may not be so permanent, it occasions a more rapid opening up of a new country than agriculture. For a thriving mining industry not only brings large tracts of country under cultivation by creating a demand for agricultural produce, but also, because of the need of transport for its valuable output, hurries forward that important step in development—the construction of railways.

Thus it is that though agriculture is still the most important occupation over the greater portion of B.S. Africa, the prosperity of the white inhabitants in certain regions rests almost entirely upon minerals.

Diamonds were first found in 1870 near Kimberley. The beds of blue clay from which they are obtained are about 70 square miles in extent and form the richest diamond mine known. The whole of the mining area is now under the control of the de Beers Co. and diamonds of the value of about £5,000,000 are extracted yearly. There are other important mines both in the Orange Free State and the Transvaal.

Gold is found in many parts in alluvial ground and quartz rock, but the most important district is in the Transvaal, near Johannesburg. There a bed of sand and clay mixed with pebbles (called the "banket" formation), fifty miles long and fifteen broad, was discovered in 1886. This goldfield, called "the Rand" (Witwatersrand is the name of a range of hills just N. of Johannesburg), produces more gold than any other single gold-mining district in the world. The gold is scattered all through the bed, with greater regularity than is the case with quartz, and often down to great depths, and it is the certainty of the supply (always remembering that mines must come to an end some time¹) that makes it worth while to erect expensive machinery for the extraction of the metal and the necessary processes of treatment. More than 100,000 unskilled labourers are wanted for these mines and the great majority of them are natives.



Panning for gold on the Veldt

Gold is found elsewhere in the Transvaal in considerable quantities and there is a rapidly increasing output from Rhodesia. In the latter, gold workings have been found which appear to be of such ancient date that by many they are believed to indicate operations of the Phoenicians more than 2000 years ago.

The total output of gold from B.S. Africa was of the value of more than £30,000,000 in 1910 and this places S. Africa easily first amongst gold-producing countries.

Copper is mined in Namaqualand, the W. section of the Cape Province, and exported from Port Nolloth: there are also rich deposits in N.W. Rhodesia which will be mined on a large scale as soon as the necessary railway is built.

¹ The average "life" of a mine may be taken as about 25 years.

Coal. The output is at present small and the quality generally inferior to the European or American coal. In the Orange Free State coal is mined round Kroonstad. In Natal there are mines in the neighbourhood of Newcastle, and in the Transvaal near Klerksdorp, and in both districts there is some iron. But the best coal is found near Wankie, in S. Rhodesia, and it has the additional merit of being not far below the surface.

Agriculture.

Seeing that the character of the agriculture of a country depends so largely upon its climate, it is important to remember the outstanding feature of S. Africa's climate—the influence of elevation. This explains the distribution of the tropical and temperate



Tobacco Field, S. Rhodesia

forms of vegetation found in the country: the former occur naturally in the northern regions which are near the Equator, and also everywhere in the lowlands on the windward side, irrespective of latitude: temperate products are to be found naturally in all southern regions except the coastal plains, and also in the northern districts which are sufficiently elevated.

What parts of the country may we regard as barren and uncultivable?

But though the main division is between the tropical and the temperate, it is never possible to draw a hard and fast line: there is always some overlapping and the forms of vegetation belonging to the areas intermediate between the two are described as "sub-tropical."

Of these the most important in S. Africa are **tobacco** and the **vine**. Tobacco has a wide range—from Nyasaland down to the south of the Cape Province through Rhodesia and the Transvaal. The vine, which was brought from France by early Huguenot settlers, flourishes particularly in the Cape Province and the Transvaal. Quite common, too, are sub-tropical fruits such as oranges, pomegranates and bananas.

Of the more strictly tropical products, **sugar**, **coffee**, **tea** and **rice** are grown extensively in the lowlands, *e.g.* of Natal. **Cotton** and **rubber**, which grow wild in parts of the country, are now being cultivated with some success in Rhodesia and Natal. Lastly, the value of the **timber** in the forests is considerable, particularly as the High Veldt regions are practically treeless.

But it is the temperate region which furnishes at present the most important agricultural output and offers most chance of expansion in the future. As the whole of the interior plateau has been shown to be well adapted to European settlement, it follows that the forms of agricultural occupation will in the main be those that are familiar in Europe. The region is first and foremost pastoral: from the Cape northwards through the High Veldt of the Orange Free State and the Transvaal right up to the rolling grassy plains of Rhodesia the rearing of **cattle**, **horses**, **sheep** and **goats** is a universal occupation. **Ostrich-farming** also is important in the Cape Province and the Orange Free State. Unfortunately the ranching industry suffers severely at times from certain natural disadvantages: the tse-tse fly, which inhabits a broad belt of country between the coasts and the plateau, is fatal to all kinds of animals: diseases like rinderpest and horse-sickness can be terrible scourges; *e.g.* an epidemic of the former in 1895 swept Rhodesia practically bare of cattle: and plagues of locusts devour crops and pasturage alike. [Notice in this connection how valuable modern scientific discoveries and experiments may be to the farmer: the malaria of the Low Veldt diminishes in proportion as the land is drained and cultivated; the inoculation of animals is stamping out rinderpest, and practical experience shows that the tse-tse fly disappears with the extinction of big game.]

Of crops, the most important is **maize** (the Kaffir “mealies”), grown universally on the drier lowlands and the windward side of the high country wherever the rainfall is sufficient. Even where there is insufficient rain, the soil is in itself so fertile that under irrigation it can be made to bear rich crops, and many schemes to make use of underground water and to control the flood-waters of rivers have already been put into operation or planned for the future. **Wheat** is grown in the S.W. of the Cape Province and Basutoland, but extensive regions inland, *e.g.* in the Transvaal, will eventually be brought under cultivation when irrigation has been further developed. Of fruits, practically every variety found in temperate Europe flourishes luxuriantly.

Insert in the map on the opposite page the principal agricultural and mineral productions or occupations.

<i>e.g.</i> Gold	... ++	Coal	... |||||	Maize	... M.
Diamonds	... Δ Δ	Copper	... oo	Pasturage	... P, etc.

In conclusion—are we to consider mineral or agricultural resources the more important to S. Africa? For the present we must say—mineral: but remember that

though the search for gold has in recent years been the chief factor in opening up new country, the agricultural resources of S. Africa as a whole are so great that her



prosperity will come to rest more and more upon them, provided that they are wisely and scientifically developed.

Industries and trade.

Our next stage is to observe how far the resources of the country contribute to her trade. You have learnt that S. Africa is at present lacking in the first essential of an industrial country—a plentiful supply of motive-power. New discoveries of coal and the use of water-power may later remedy this: for instance, the deposits of excellent coal near Wankie together with the development of power from the Victoria Falls suggest that S. Rhodesia may some day become a busy manufacturing district: but the possibilities here, and elsewhere in the country, lie in the future.

As the country is so largely interested in agriculture, what industries there are will be connected with the manufacture either of the produce of the fields or of implements required by the farmer. Thus there are sugar-mills, breweries, flour-mills, wagon and harness factories to be found in the different provinces, but as yet there are no large towns entirely devoted to industrial occupations. The nearest approach would be Johannesburg where a large industrial population is busy with the many mechanical processes connected with the winning of gold. Only here, out of the whole of S. Africa, would the chimneys of furnaces, the din of the crushing-stamps and the hum of machinery remind a traveller from one of our manufacturing districts of sights and sounds familiar to him at home.

Thus when we enquire into the trade of S. Africa, we find the usual conditions that exist in any new country. In the list of exports, gold and diamonds come easily first in value: of agricultural productions, wool (including mohair, the silky hair of the Angora goat) is most important, and next come ostrich feathers, hides and sugar: with regard to others, such as tobacco, wine, etc., the country has hardly advanced beyond the self-supporting stage, but with an increased area of cultivation there will be a greater surplus for export, not only of luxuries but also of such necessities of life as wheat.

Lastly, remembering that imports are brought into a country to supply its deficiencies, we find that the import trade of S. Africa consists chiefly of manufactured goods of every description, and as these come mainly from the United Kingdom, it is not easy to over-estimate the value of B.S. Africa as a market for our manufactures.

Under what possible circumstances might we lose S. Africa as a market for our manufactures?

Communications.

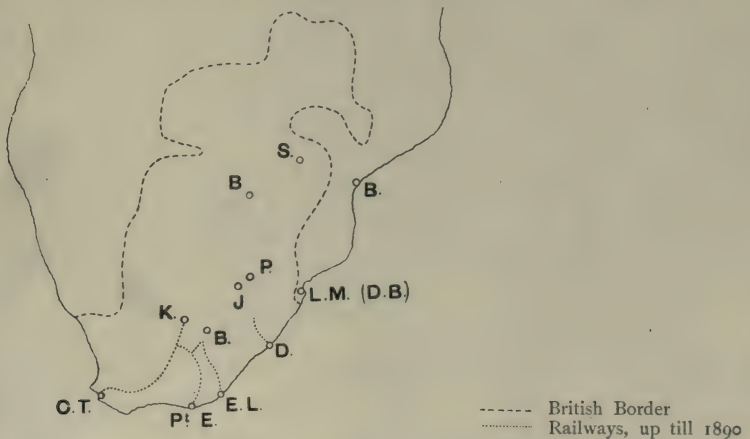
The surface-features on the whole do not present many serious obstacles to transport: engineering problems such as those that have to be dealt with in the Canadian Rockies are rarely encountered in S. Africa. But there are two particular difficulties; firstly, the climb from the lowlands through the mountain rim to the interior plateau; secondly, the passage of the rivers. In the former case it has been found possible to minimise the difficulty by using the passes which nature has provided; in the latter, the old “drifts” are being rapidly superseded by bridges as the development of the country proceeds.

As the country is very poorly equipped with navigable rivers, the ox-wagon has from the earliest times been the chief means of transport and it was long before the

roads were anything more than mere tracks, inches deep in dust or mud according to the season. The main roads throughout the country are now well constructed, but in the remoter parts there is still nothing better than the wagon-track.

No very great improvement was to be expected till the coming of the railway. The first line was built as long ago as 1857, but while the country remained almost entirely agricultural, little headway was made: in fact, up till 1890 only the Cape and Natal possessed any railways and Kimberley was the extreme point reached to the north.

In deciding upon the routes of railways the first consideration is to connect productive regions with the sea: in the case of Canada we have seen how this involved a great East and West route, based upon agricultural development. But in S. Africa it was the discovery of gold and other mines in the "eighties" that gave the first real impetus to railway construction, and the wedge-like shape of the country has created



north and south lines rather than east and west, as only the south coast contained British ports.

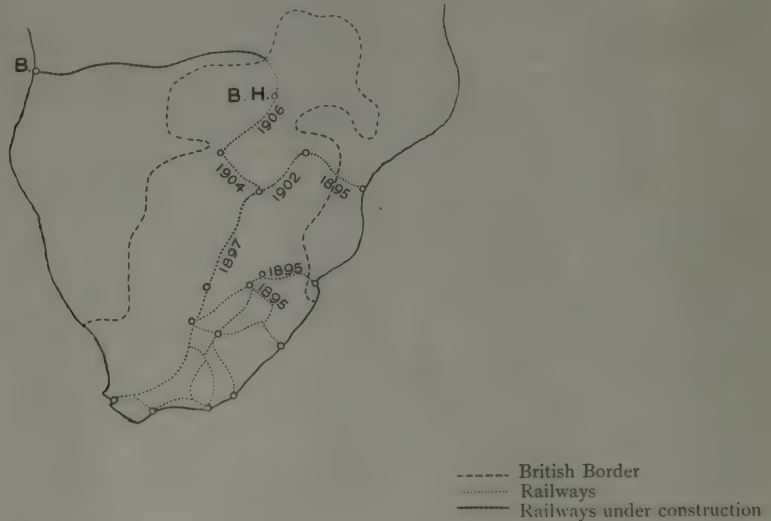
But the importance of connecting the producing regions with the nearest coast was recognised before long by the building of railways from Johannesburg to Delagoa Bay and from Salisbury to Beira (the latter, even before Salisbury was connected with Bulawayo and the line from Cape Town). Neither port is British but you will observe that both routes are short compared with the possible alternatives to the British ports on the far distant south coast. [Even Durban is 120 miles further from Johannesburg by rail than Delagoa Bay.] Similarly the railway from Benguela to N. Rhodesia, now under construction, will eventually be the chief outlet route of that region for goods passing to and from Europe, for Benguela is 1500 miles nearer Europe than Cape Town.

Again the rapid growth of railways since 1890 must be largely put down to Rhodes' determination to open up the new country and to link together by rail all the British possessions in the continent. Of the total length of 6700 miles from the Cape to

Cairo, more than 2000 miles of the trunk line from Cape Town northwards are completed. After the junction has been made with the line coming from Cairo (at present it reaches well south of Khartoum), east and west branches to the coasts will be constructed and the Atlas shows that some of this branch work has already been done ; *e.g.* from Port Sudan and Mombasa.

Lastly, you will notice why the railway system should hug the eastern side of the British territory. Though the railways in many cases followed the mines, they were also constructed with a view to leading agricultural development, and the lack of the rainfall necessary to cultivation on the western side (*e.g.* Kalahari Desert) explains why those regions are entirely unprovided with railways.

Identify the towns on the map below and initial them.



Figures refer to dates when the different sections were completed

Population and Towns.

The total population of the country is estimated to be rather more than ten millions, of whom only one million and a quarter are white. The whites are outnumbered everywhere by the natives ; in the Cape Province the proportion is 4 to 1 : in Natal, 10 to 1 ; further north the disproportion increases till in N. Rhodesia it is as much as 50 to 1. The original inhabitants are represented by Hottentots and Bushmen : both are inferior races and the latter—perhaps the most degraded of all known peoples—are practically only found in the N.W. corner of the Cape Province. They have both been dispossessed of their country by invading hordes coming from north of the Zambesi. Many of these tribes are peculiarly warlike, *e.g.* the Zulus and Matabele, and nearly all are more intelligent than the true Negro. Though many of them work from time to time in the mines, they are a pastoral and agricultural people and under the

orderly rule of the British they prosper greatly and are increasing in numbers. Throughout S. Africa they are commonly referred to as Kaffirs. The Whites are principally British or Dutch; the latter, as a pastoral people, live chiefly in the country, while the British, although they have done a fair share of pioneer work in developing agriculture, have tended recently to congregate more and more in towns [cf. Australia].

Seeing that the white population is barely a fifth of that of London and that agriculture is still the most widely spread interest, the country is not likely to contain many large towns. Let us consider how the position of the chief centres of population has been determined.

A. Firstly, the best available positions on the coast would be chosen for the **ports**: these have grown in number and been improved in character to keep pace with the development of the country and the demand for fresh entrances and exits. For instance, it was not till the opening of the Transvaal mines promised a considerable import and export trade, that Durban could afford to undertake such expensive harbour-improvements as the removal of the large sand-bar which blocked the entrance.

B. Again, in the early days, towns would come into existence to supply the need of **agricultural markets**: in fact, the majority of the towns in the country were of this type till the discovery of minerals, and this has been so recent that even now there are only four towns with more than 40,000 inhabitants.

C. Next, the development of the mines created **mining townships**: for instance, Newcastle (Natal) and Kroonstad (O.F.S.) owe their origin to the coal of their neighbourhoods. Of the gold-mining towns Johannesburg is the best example, and it illustrates in a remarkable way the common characteristic of such towns—rapidity of growth: in 1880 it did not exist at all, but to-day boasts a population of more than 150,000.

What city in Canada can you compare with Johannesburg in this respect? Was the reason for its rapid growth the same?

D. Lastly, in addition to the above, in some cases special circumstances may account for the position or the growth of a town. Pietermaritzburg, beginning as an agricultural centre, became the seat of a provincial Government. Bulawayo, with a similar early history, can look forward to rapid growth because it is becoming an important railway junction. Livingstone, again, grew up in close proximity to the Victoria Falls and has a great future before it, dependent upon the water-power that will become available.

Considering the many points of similarity between Australia and S. Africa, why has the former two cities so much larger than any in S. Africa?

The Chief Towns.

Figures of population in brackets denote thousands.

Decide in each case whether the town fits the circumstances of the sections A, B, C, or D.

Cape Town (80) is situated on the shores of Table Bay under the shelter of Table Mountain. It is the oldest town in S. Africa, the chief port, the terminus of the most important railway-line and the meeting-place of the Parliament of the Union.

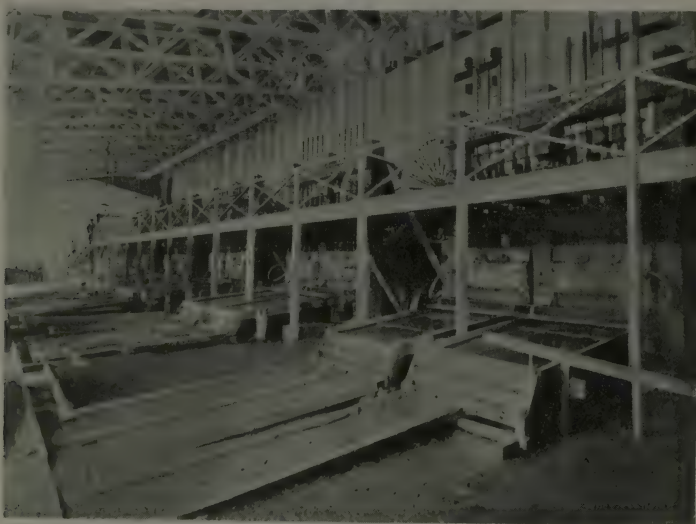
Not far to the south, in a recess of False Bay, lies **Simon's Town**, the Imperial Naval Station.

Port Elizabeth (40), though little more than an open roadstead, is the chief outlet of a rich agricultural district, having almost a monopoly of the wool export trade. It is also connected with Kimberley, and the Transvaal mining regions *via* Bloemfontein.

East London (25) is a rising port and serves the agricultural districts behind it (including the Orange Free State) as a gateway for exports and imports.

Kimberley (35) grew up round the mining camps on the bare veldt and its industries are entirely connected with the diamond diggings. Since 1892 it has developed importance as a railway junction.

Durban (70), with its improved harbour, is the chief outlet of Natal, and to a large extent, of the Orange Free State and the Johannesburg district, with both of which



Consolidated Gold Mine, Johannesburg

Mercury-troughs (cf. p. 109)

it is connected by rail. The tonnage of shipping passing annually through the port is greater than that of Southampton.

Pietermaritzburg (30) is the capital of Natal and the seat of the provincial Government. It has some manufactures, mainly brewing and wagon-making.

Bloemfontein (30) is the capital of the Orange Free State and an agricultural centre. Situated 4500 ft. above the sea, it has an excellent climate and is somewhat of a health resort.

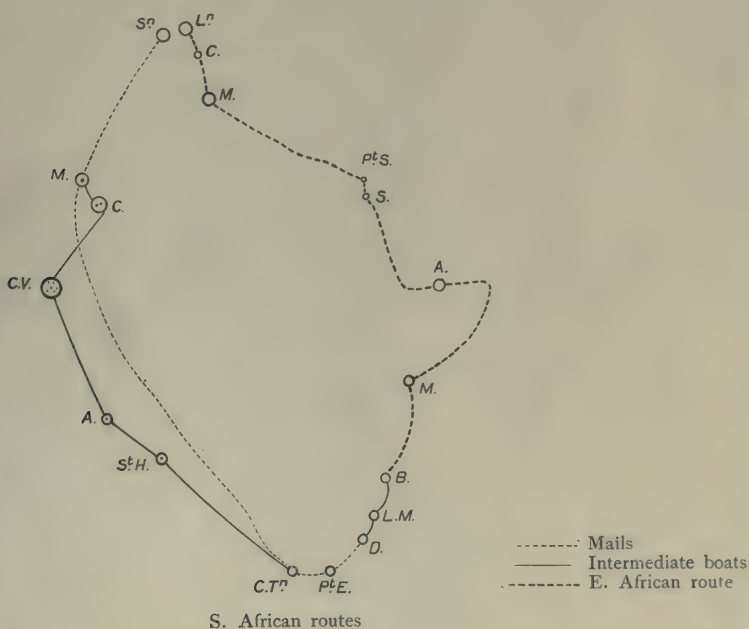
Johannesburg (160) is far the largest city in S. Africa. It is situated among desolate surroundings with no attraction except the gold-mines. These stretch along the Rand for at least 50 miles and have made the city the chief mining centre of the country. Different railways connect it with Lourenço Marques, Durban, Port Elizabeth and Cape Town.

Pretoria (36) is picturesquely situated in a hollow amidst the hills and is the administrative seat of government of the Union. It is of some importance as an agricultural centre and will probably grow rapidly when the goldfields in the neighbourhood are further developed.

In S. Rhodesia, **Salisbury** is the seat of government and **Bulawayo**, growing in importance as a railway junction, is the commercial centre.

In Nyasaland there are but few towns at present: the largest is **Blantyre** (named after the birthplace of Livingstone) with only 6000 inhabitants, most of whom are natives: it is the headquarters of the traders of the Protectorate and is in communication, partly by rail and partly by water, with the mouth of the Zambesi.

The native towns in S. Africa are not of any size generally: the largest is Palapye, in the Bechuanaland Protectorate.



Communications with the outside World.

Cape Town is separated from Southampton by 6000 miles. You will notice on the way certain groups of islands which suggest convenient halting-places.

From the Atlas find which European nations own these islands and mark their names on the diagram.

Why are the ports of call in these islands rather than on the coast of W. Africa between 10° and 30° N., which is not far distant?

The fast mail boats of the Union-Castle line complete the journey from Southampton to Cape Town in $16\frac{1}{2}$ days, stopping only at Madeira, and proceed as far round

the coast as Durban. Intermediate boats of the same line, starting from London and calling at Southampton, touch at one or two of the halting-places and reach Cape Town in about 21 days. Thence they coast round to the eastward ports as far as Lourenço Marques, and some make Beira their terminus. Here they meet vessels that have used the alternative route *via* the Mediterranean, Suez Canal and Aden. The whole journey to Beira occupies the same time (28 days) by either route, but in the case of the Mediterranean route part of the journey must be made overland, from Calais to Marseilles.

Identify the ports or islands represented by initials on the preceding page.

South Africa is not, however, only concerned with European trade and thus is not a terminus. We have seen how convenient the Cape was as a port of call in the old sailing days: in modern days it is no less important as a coaling station, because nearly half the shipping that reaches the Cape proceeds further to Australasia, India and the Far East.

Government.

In 1910 Cape Colony*, Natal, the Orange River Colony* and the Transvaal formed themselves into the Union of South Africa under the British Crown.

The King is represented by a Governor-General who holds office during his Majesty's pleasure: he is assisted by a Council chosen from the Ministers of State. There are two Houses of Parliament—the Senate, of 40 members, and the House of Assembly, at present of 121 members: the functions of these bodies are much the same as those of our Lords and Commons. The seat of government is Pretoria, but Parliament meets at Cape Town.

In addition, each Province has an Administrator and a Provincial Council. These Councils deal with local affairs only, in the same way as the Provincial Governments in Canada and Australia.

Rhodesia is still administered by the British South Africa Chartered Co., but will probably join the Union later. Its local legislation, native affairs and military forces are subject to the control of the Governor-General of S. Africa.

The eastern part of Nyasaland is a Protectorate under the direction of the Colonial Office, but the western part, bordering on N.E. Rhodesia, is administered by the Chartered Co.

* Since the Union these names have been changed (see page 121).

BRITISH EAST AFRICAN POSSESSIONS.

These include the following Crown Colonies :

The East Africa, Uganda, and Zanzibar Protectorates and British Somaliland.

Our interest in these regions began in Zanzibar, where by 1860 our influence with the Sultan was supreme and most of the coast trade was in the hands of British subjects. In the early "eighties" of last century a number of merchants, who very shortly formed themselves into the British East Africa Chartered Co., leased from the Sultan certain territory on the mainland. Here they established forts and trading-stations, with Mombasa their headquarters. In 1890, after proclaiming a Protectorate over Zanzibar, Uganda was brought under British influence by Sir Frederick Lugard and the boundary settled with the Germans on the southern side. In 1895 the British Government took over all the interests of the Chartered Co. and formed the two Protectorates.

Surface-Features and Resources.

The area of British East Africa and Uganda combined is about three times that of the British Isles. The country consists of three well-marked belts running roughly parallel to the coast. First, a low-lying coastal plain with tropical rainfall, dense forests and fertile soil : next, a dry belt, with a soil too poor to be productive, sloping gradually up to the third division—the plateau country, which is above 4000 ft. and reaches a maximum of nearly 17000 ft. in Ruwenzori. This last region is very varied in character ; there are lakes, the largest of which is almost as big as Ireland ; among the mountains are both glaciers and volcanoes, while vast forests clothe the lower slopes ; there are tracts of desert land, deep valleys with tropical vegetation, and on the plateau there is agricultural and pastoral land as rich as that of Rhodesia.

As in S. Africa, the productions vary with the elevation : the tropical products of the coast-lands include the **coco-nut palm, rubber, coffee, sugar, dates, bananas** and other tropical fruits. In the sub-tropical interior are immense forests of valuable **timber**, in the higher lands **grain** grows well, and in Uganda particularly there seems to be a great future for **cotton**.

As yet the development of the country has not gone very far and there are not many more than 1000 white men in both Protectorates : but in the short time of our occupation, a railway has been built from Mombasa to Port Florence connecting the coast with the productive interior and with the navigable waterways : on L. Victoria Nyanza are several Government steamers ranging in size up to 1000 tons. The chief exports of the country are copra (from the coco-nut), ivory, rubber and hides.

The largest town is **Mombasa** (30) ; it has perhaps the best harbour on the E. African coast from the Cape to the Mediterranean : the town stands on an island connected with the mainland by a railway bridge. The seat of government in E. Africa is **Nairobi**, which has a larger white population than Mombasa ; in Uganda, it is **Entebbe**.

(See sketch-map.) The journey from Nairobi to England *via* the Suez Canal occupies about 21 days.

The **Zanzibar Protectorate** comprises the two islands of Zanzibar and Pemba. Though the Sultan has lost most of his mainland possessions and his ancient power, his capital, **Zanzibar** (70), is the largest sea-port on the east coast. The harbour is very extensive and is the commercial centre of the trade of E. Africa with India and Arabia. Zanzibar is extremely fertile and the chief export trade is in **cloves**. English, French and German steamship lines run between Zanzibar and N.W. Europe *via* the Suez Canal in about 20 days.



British East Africa and Uganda Protectorates

British Somaliland, which is roughly as large as England and Wales, lies opposite Aden and helps to secure our position at the entrance to the Red Sea. **Berbera** is a useful port and there is some export of the products of resinous plants, such as myrrh and frankincense.

BRITISH WEST AFRICAN POSSESSIONS.

These include Nigeria, the Gold Coast Colony, Sierra Leone and Gambia, and their total area amounts to about four times that of the British Isles.

The surface-features are somewhat similar in all: the coast regions are largely swamp, with mangrove forests fringing the shores: behind these for a distance of about 200 miles is a country of dense tropical forest, and further inland still are grassy and wooded uplands which border on the higher plateau of the desert interior.

The climate is tropical, with a small range of temperature (cf. isothermal map) and rainfall varying from 50 inches in Gambia up to 160 inches in Sierra Leone. The rainy season is in summer, when the S.E. trades are converted into a S.W. monsoon such as occurs in India. The coast regions are very unhealthy for Europeans, but as the rainfall diminishes with distance from the coast, the drier upland districts are quite healthy.

Development.

The chief attraction of W. Africa to European traders lay in the fact that it could supply slaves for export to the plantations of the W. Indies. The English had been introduced to this lucrative trade in slaves by Hawkins in Elizabeth's reign, and the desire to obtain our share of the business led us to capture Cape Coast Castle in 1665. For the next century and a half we were constantly quarrelling over the matter with Dutch, French or Portuguese, but up to the time of the abolition of slavery in the Empire (1833) we made little effort to develop trade in any other commodity but "black ivory." During the last half of the nineteenth century, when the scramble for Africa began amongst European Powers, we were within an ace of being crowded out by French and Germans (the Atlas shows how we are hemmed in), but our possessions were just saved by the enterprise of British merchants and Trading Companies; for instance, the inland parts of Nigeria were only secured by the energy and foresight of Sir George Goldie, and later of Sir Frederick Lugard, who forestalled our rivals in making treaties with native chiefs and established a British Protectorate over their country.

Resources.

The soil is extremely fertile and European enterprise is opening up great possibilities for the future. The Forestry Department keeps a watch upon the **valuable forests** of teak, ebony and mahogany; clearings are being made for the cultivation of **maize, coffee and cocoa**; the natives are being taught how to tap **rubber-trees** economically and every village has to keep up a plantation for the common benefit. Northern Nigeria is particularly suited to the growth of **cotton**, and the British Cotton-growing Association considers that the future prosperity of the country will depend upon this industry. Tropical products of every kind flourish abundantly—the **palm**,

rice, yams, ground-nuts and kola-nuts (the oil from which is used in the making of soap and candles) and many fruits.

Mineral resources are not yet fully developed, but a considerable quantity of gold is produced (especially in the Gold Coast Colony) and recently valuable deposits of tin have been discovered in Nigeria. The chief exports are palm-oil, gold, ground-nuts, rubber, ivory and cotton.

The imports are chiefly manufactured goods generally and cutlery in particular. West Africa, then, already a valuable market for British wares, will become still more so as the natives advance in prosperity under British rule. Hence great efforts are being made to open up the country: roads are being made to replace the native forest-path: railways have been, or are being, built to connect the productive interior regions with the coast, and explorations have shown that there are on the Niger and tributaries more than 1000 miles of navigable waterways. Unfortunately the ports all along the coast are very inferior.

Population and Towns.

The white population is extremely small, the total number hardly reaching 3000.

The black peoples (largely negroes) on the other hand are very numerous, but no reliable figures are yet available.

The chief towns are nearly all on the coast.

In Gambia, **Bathurst** is the seat of government. Of Sierra Leone, **Freetown** (36) is the capital: it is a great trade centre and as an Imperial Naval coaling-station is the most important sea-port of the region.

Accra (18) and **Cape Coast Castle** (30) are the chief outlets of Gold Coast Colony, the former being also the seat of government.

In Southern Nigeria the chief town is **Lagos**, the headquarters of the Administration and the starting-point of the railway to **Zungeru**, the capital of Northern Nigeria.

In addition, there are many native towns of considerable size in the interior, the largest of which is said to have a population of between one and two hundred thousand.

All our possessions in this quarter of the world are Crown Colonies, each with a Governor and Council. Quite recently the two divisions of N. and S. Nigeria have been united under one administration.

There is regular communication by steamer with the British Isles, the passage occupying from 14 days (Gambia) to 16 (Lagos). Liverpool is the port most interested in W. African trade.

THE WEST INDIES.

[British Guiana and British Honduras, owing to their proximity and generally similar character, are included here, and the Bermudas, though actually 1000 miles away, are most conveniently dealt with in this section.]

History.

As the result of Columbus' discoveries the W. Indies and the mainland opposite came at first into the hands of Spain. Our connection with the islands dates from the early part of the 17th century. Barbados was first settled in 1625 and thirty years later Jamaica was captured by an expedition sent out by Cromwell. Since then Spanish, English, Dutch and French have competed for the possession of the most valuable islands and the W. Indies became a secondary battleground of combatants who were fighting out their main quarrels three or four thousand miles away. As the fortunes of war in Europe varied, many of the islands, used as pawns in the making of treaties, frequently changed hands, and actually Barbados is the only one of our possessions that has never ceased to fly the British flag. From 1630—1700 the Buccaneers (of any nation) harried and robbed the Spaniards: then English and French fought each other through the stormy times of the 18th and early 19th centuries, while the Dutch from time to time threw themselves into the fray, generally on the side of the French. Not till the Napoleonic wars were over had the W. Indies any lasting respite from war's alarms. You may imagine, therefore, that what prosperity has been attained by British colonists was won under the most discouraging circumstances and often at tremendous personal sacrifices.

Area, position and character.

The British W. Indies are in area about half as large as Scotland. Jamaica, the biggest island, is rather more than twice the size of the county of Norfolk: the others vary in size from Trinidad (half as big as Jamaica) to Barbados (rather larger than the Isle of Wight) and down to tiny islets of half a dozen square miles.

British Honduras is rather larger than Wales: it was declared a British colony as late as 1862, though for many years previously it had been considered as an offshoot of Jamaica.

British Guiana (which was acquired in 1814) is as large as Great Britain.

The total area of the Bermudas is only 20 square miles.

The W. Indian Islands appear to be remnants of an ancient land connection between Trinidad and Florida, long ago submerged. Most of them are mountainous and present many varieties of geological formation; e.g. limestone, sandstone and coral.

Coral formations are usually confined to the Tropics: can you suggest any reason why coral should be found as far outside the Tropics as the Bermudas?

Some, like St Vincent and St Lucia, are of volcanic origin and disastrous eruptions have occurred right down to modern times; e.g. that of the Souffrière (St Vincent) in

1902, which caused widespread destruction of property and the loss of more than 2000 lives (cf. p. 7).

British Guiana and Honduras, being larger, present surface-features of a more varied character: first, a flat and often swampy coastal plain, formed, in the case of Guiana, of rich alluvial material brought down by the local rivers or swept along by the tide from the mouths of the Orinoco and Amazon, and so low that it is necessary in parts to maintain dikes to keep out the sea.

At a distance of 20 to 50 miles from the coast begin the grassy upland plains which rise as high as 1500 feet: and lastly, these plains are gradually merged in a more mountainous and well-forested interior.



Scenery in Jamaica

Perhaps the chief characteristic of the islands is the extraordinary beauty of the natural scenery common to nearly all. Their mountains and valleys in the clear atmosphere supply a wonderful diversity of landscape outline, and the variety and luxuriance of vegetation entitle them to be described as veritable gardens of Paradise.

Climate.

Temperature.

Examine the isothermal map.

All our possessions, except the Bermudas and some of the Bahamas, lie within the Torrid Zone. The mean annual temperature of the Northern Islands is about 75° F., that of the Southern Islands about 82° F. But the islands are fortunate in being small enough to benefit in every corner from the sea-breezes, which moderate the heat to such

an extent that few of the discomforts of the tropics are felt and many islands have become health resorts, chiefly for Americans.

Guiana, as part of the mainland and quite near the Equator, has greater heat and less relief from the sea-breezes.

Rainfall.

With the rainfall map consider the following :

1. The direction of the prevailing winds.
2. The surface over which they blow.
3. The question of evaporation in tropical seas.

Bear in mind also the question of elevation in the islands.

The general average for the region is 60 inches, but local conditions, especially in the larger islands, cause variations ranging between 40 and 200 inches. The rainy season in particular is from May to the end of October, and during August and September the region is liable to be swept by violent hurricanes : these blow with such fury as to work great havoc amongst shipping in the harbours, to uproot forests and whole plantations, and even to sweep away towns that lie in their track. They are often productive, also, of terrible floods. As an instance of the damage they may do to agriculture, in 1899 all the limes in Montserrat were destroyed by a single storm.

Why are most of the towns in the W. Indies on the western or southern side of the islands ?

Resources and Trade.

Agriculture is all-important. The soil nearly everywhere is of such fertility and the climate so beneficent that all tropical products flourish in the utmost luxuriance.

Sugar has always been the staple agricultural industry, so much so that the state of the sugar trade has afforded an unerring measure of the prosperity of the W. Indies. Up till 1800 large fortunes were made by the planters, but in 1807 a heavy blow was struck at them when the British Government prohibited the further importation of slaves. However, till the end of the Napoleonic Wars (1815), the control of the sea by the British Navy gave the W. Indies a monopoly of the sugar trade with Europe. In 1833 slavery was abolished altogether and, as the planters were not adequately compensated, ruin stared them in the face. They were finally crushed by the competition with beet-sugar grown in Europe, because the Governments of France and Germany granted bounties to their farmers which enabled them to undersell the West Indian producers of cane-sugar. The production, therefore, in the W. Indies was soon reduced by four-fifths. Recently some hope has been restored to the planters by help from the Home Government and still more by the declaration at the Brussels International Sugar Convention of 1902 that beet-sugar shall no longer be assisted by bounties. Though the sugar trade has been so seriously diminished, it is still more important than any other and in British Guiana the sugar cane occupies seven-eighths of the cultivated ground. The decay of the trade, however, has had one good effect in calling attention to possibilities in other directions : in many islands substitutes have

been found in the shape of **cotton**, **tobacco**, and **fruits** like bananas, oranges and pine-apples. Jamaica is the chief grower of tobacco and fruits, and fast steamers specially fitted with refrigerator-chambers are run from Kingston to Bristol and to the United States.

Of other products which are grown almost universally the chief are **spices** (nutmeg, pepper, cinnamon, etc.), **coffee**, **cocoa** (from the cacao tree), **vanilla**, **limes**, **rice**, **ginger**, and **coco-nuts**.

The forests yield valuable **timber**, cabinet-woods and dye-woods. **Mahogany** is the most important: the best quality is grown in Jamaica, the greatest quantity in British Honduras. Experiments have shown that the **rubber-tree** gives excellent results in the inland valleys of British Guiana and the island of Tobago.

The **mineral** resources are small: there is no coal and no iron. British Guiana, one of the regions where Raleigh and others sought for the fabulous El Dorado, contains some **gold** in the interior forest regions. **Salt** is obtained from shallow lagoons that fringe some of the islands. Trinidad is the possessor of a lake of **pitch** a hundred acres in extent, called La Brea, which provides an important export of asphalt: deposits of **petroleum**, too, have lately been discovered in the island, and they promise to develop well.

There is very little industrial activity, but a supply of agricultural raw-material encourages some manufacturing: there are sugar-factories (including rum and molasses), rice-mills, cocoa and tobacco factories, saw-mills and tanneries. Wind-power is still extensively used in Barbados, but coal is too dear to enable W. Indian manufacturers to compete with those of Europe or the United States. There is a possibility of development in British Guiana when use can be made of the water-power provided by the magnificent Kaieteur Falls (800 feet high), on a tributary of the Essequibo River.

The chief exports are sugar, cocoa, bananas and spices. The imports are almost entirely manufactured goods and the West Indies do more trade with the United States than with the British Isles.

Now let us consider the W. Indies from another point of view. Many of our colonial possessions, especially those of small size, have been acquired for strategical purposes: others, which were seized firstly on account of their commercial value, have since become important strategically. Under this head come the W. Indies. Consider the position of the following on the western side of the Atlantic. In the north, Canada, with the naval station of Halifax: next, the Bermudas, 600 miles from the American coast, with a dockyard and naval establishment on Ireland Island—a useful foothold midway between Canada and the W. Indies: in the far south, the Falkland Islands, lying opposite the Magellan Straits and offering a harbour of refuge in case of need at Port Stanley. The W. Indies fill a gap in the centre and, in view of the approaching completion of the Panama Canal, their strategical importance must increase very largely.

Next, examine the local position of our W. Indian possessions. The islands entirely close the Caribbean Sea: true, vessels can penetrate the barrier almost anywhere, but there are certain more easily navigable passages of recognised importance.

Find in the Atlas the Florida Strait, Windward and Mona passages and the entrance between Barbados and Trinidad, which we may call the S.E. Passage.

In relation to these passages, the position of Jamaica would enable a British fleet to keep a watch upon all movements from the Atlantic into the Caribbean Sea and from the Panama Canal outwards into the Atlantic. Thus Kingston is the chief Imperial naval and coaling station. In the S.E., Castries (St Lucia), the best natural harbour of the whole region, is within striking distance of both the S.E. and Mona passages, and is a fortified naval base.

On the commercial side, regular steamship lines connect the W. Indies with the outside world, particularly the British Isles and the United States. (Map, p. 148.) The Imperial Direct West Indian Mail steamers run from Bristol to Jamaica and back, using the Windward Passage. From Southampton the Royal Mail Steam Packet



Strategical

vessels sail to Barbados and thence to Port of Spain (Trinidad): from there they proceed to Kingston by way of Colon, after touching at ports on the S. American coast. From Kingston they continue to N. York, their outward terminus, and follow the same route on the return journey. From Barbados or Port of Spain smaller steamers branch off to the neighbouring islands and British Guiana, and British Honduras has connection with Kingston.

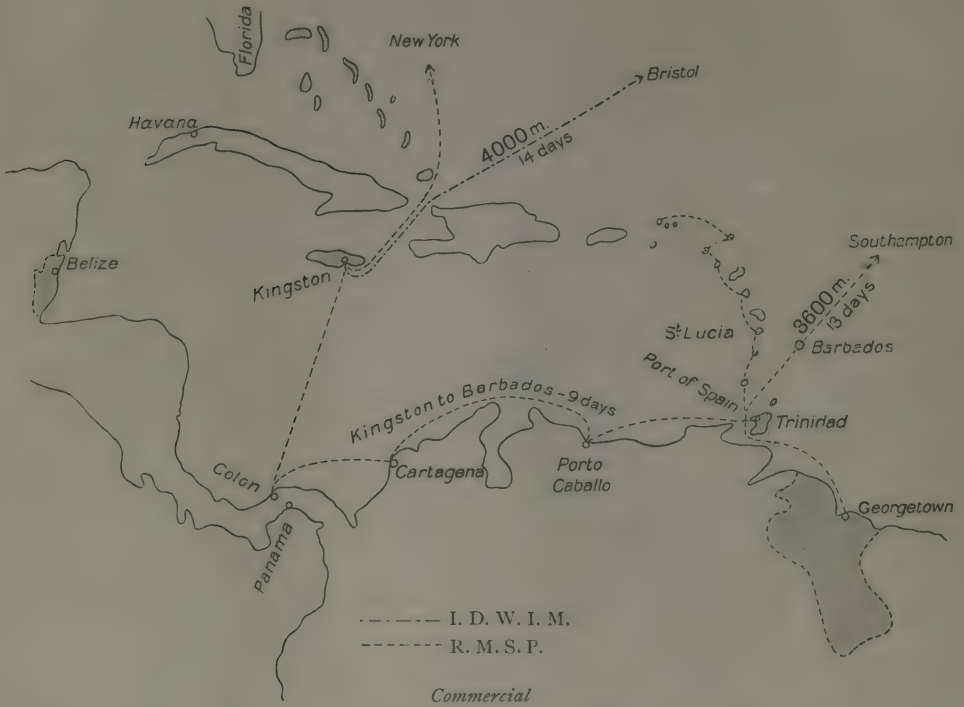
Population and Towns.

The total population of the British W. Indies is about 1,500,000 and of British Guiana about 300,000. The Caribs, the original inhabitants, have practically disappeared, though there are remnants to be found in St Vincent and British Guiana. Negroes of W. African origin form the main part of the population and outnumber the Europeans overwhelmingly; *e.g.* in Jamaica, to the extent of forty to one.

In a region entirely given up to agriculture, there are naturally but few large towns, and the largest are all ports.

Georgetown (60) is the commercial gateway of British Guiana and the seat of the Administration.

Port of Spain (56) is an important trade depôt, the collecting and distributing centre of the S.E. islands and the mainland opposite. It has become the junction of the main shipping line and the intercolonial branches to the S.E. islands.



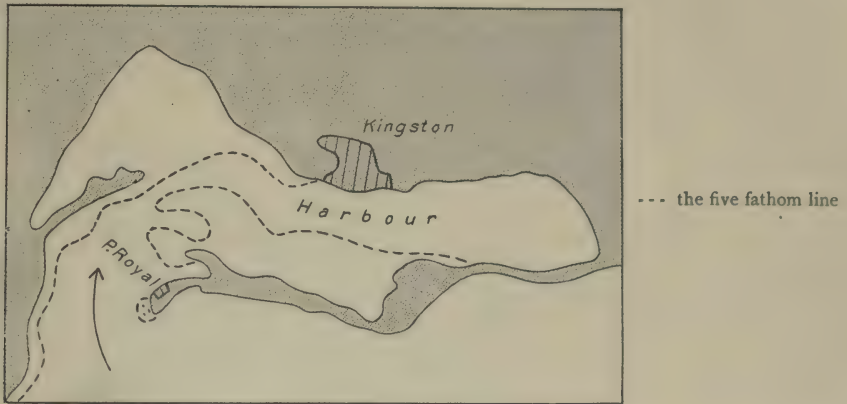
Kingston (47) is the outlet of the richest of the islands and may be considered the commercial capital of the W. Indies. The two British steamship lines have made it their W. Indian terminus and Port Royal, on the south side of the harbour, furnishes the naval headquarters of the region.

Government.

Seeing that the large majority of the population is negro, complete self-government is impossible. All our possessions, therefore, are Crown Colonies. The islands are grouped as follows and the seat of government in each case is inserted in brackets :

- (1) Bermudas (Hamilton), (2) Jamaica (Kingston), (3) Bahamas (Nassau),
- (4) Leeward Islands (St John's, Antigua), (5) Windward Islands (St George, Grenada),
- Barbados (Bridgetown), (7) Trinidad (Port of Spain).

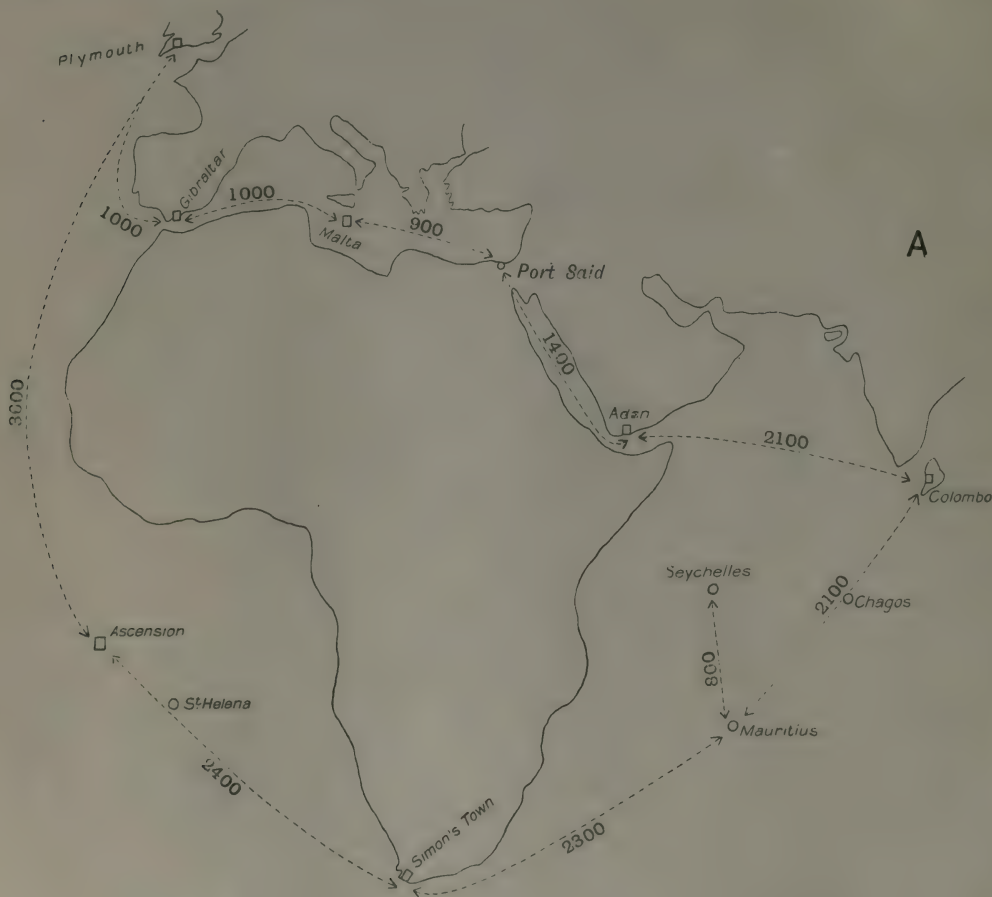
Each has a resident Governor and a Legislative Council, but only Jamaica, Barbados and the Bermudas have some measure of self-rule. British Honduras is a Crown Colony with no local representation. British Guiana, also a Crown Colony, has, in addition to a Governor, an Executive Council and Legislative and Financial Councils.



Various proposals have been made to form a W. Indian Federation under one Central Government. There would be many advantages in this, particularly in saving the expense of keeping up so many separate administrations, but the chief difficulty is one of distance: *e.g.* Jamaica and Trinidad are 1000 miles apart and there is a still wider gap between the Bahamas in the north and B. Guiana in the south.

BRITISH OUTPOSTS ON THE ROUTES TO THE CAPE, INDIA AND THE FAR EAST.

In area the majority of these are quite insignificant, but on account of their position they are of great importance as links in the chain of Empire: for they are so situated on the main lines of ocean traffic as to provide us with storehouses and coaling stations (both naval and commercial) which are invaluable safeguards of, and aids to, our world-wide commerce.



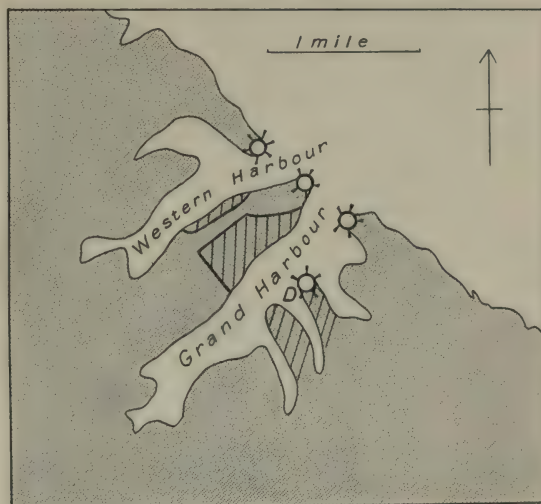
[Figures correct to within 25 miles]

Diagram A shows coaling stations (O) and fortified coaling stations (□), with distances between arrowheads reckoned in nautical miles. When calculating the time taken by a vessel over any particular distance, you may take 15 knots as the speed of a P. and O. liner, and 20—25 knots as that of a fast cruiser.

[In the following paragraphs the date in brackets shows the year in which each possession was acquired.]

Gibraltar (1704) is the key to the western entrance (13 miles wide) of the Mediterranean. Strongly fortified, it has long been a naval base and coaling station. The harbour is being greatly improved and there are dockyards for naval vessels of any size. It is not a Crown Colony but is governed as a fortress.

Malta (1800) stands at the point where the Mediterranean is narrowed between Sicily and North Africa. **Valetta** is a deep fiord harbour and the headquarters of our Mediterranean Fleet: as a great naval and military arsenal it is strongly fortified and garrisoned. It is a Crown Colony, but the Governor is generally a high military officer.



Valetta

⊛ Forts

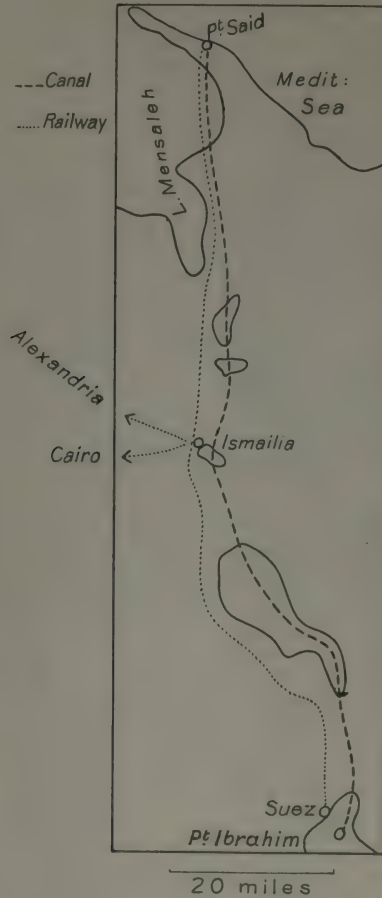
D. Dockyard

W. Harbour—Commercial

Though Egypt is not a British possession, the fact that we have practically managed Egyptian affairs for the last thirty years, and the extent of our Eastern trade, give us a particular interest in the **Suez Canal**. It is a sea to sea canal without locks, as there is only a difference of six inches between the mean tide levels of the Mediterranean and Red Seas. The length is 87 nautical miles and the surface breadth at its widest is 420 feet: it is being deepened from 31 to 34 feet. No vessel may travel through at a higher rate of speed than $5\frac{1}{2}$ knots and the passage averages about 17 hours. At intervals there are bays in the banks to enable ships to pass one another and electric light has been installed along the whole length of the Canal. At Ismailia the Canal is met by railways from Alexandria and Cairo. Through the shallow Lake Mensaleh both canal and railway are carried along a strip of sand and at the Suez end the Canal is embanked through the shallow water at the head of the Gulf: where deep

water is met Port Ibrahim has been constructed. The Canal was built by the French and finished by their engineer, de Lesseps, in 1869. It is managed by an International Board of Directors, including ten British representatives, and by convention is open to all vessels of all countries in time of peace or war.

Calculate from Diagrams A and B the time or distance saved by the Canal between European and Asiatic ports.



Aden (1839) is a naval coaling station almost as strongly fortified as Gibraltar. Standing at the mouth of the Red Sea it may be said to cover the eastern entrance to the Mediterranean through the Suez Canal.

In addition it is of great commercial importance as the meeting-point of trade-routes from Europe, E. Africa, India and Australasia. It is under the control of the Governor of the Bombay Presidency and part of the garrison is usually drawn from the Indian Army.

Perim (1857) is a commercial coaling station and **Sokotra** (1886), though never officially occupied, is leased to us by the ruling Sheikh.

Ascension (1815), lying in the direct track of vessels bound for the Cape, was of far greater importance before the Suez Canal opened up an alternative and quicker route to India. **Georgetown** is still a fortified coaling station, and the island under Admiralty control is rated as one of H.M.'s ships. The healthy climate has made it a sanatorium for W. African officials to some extent.



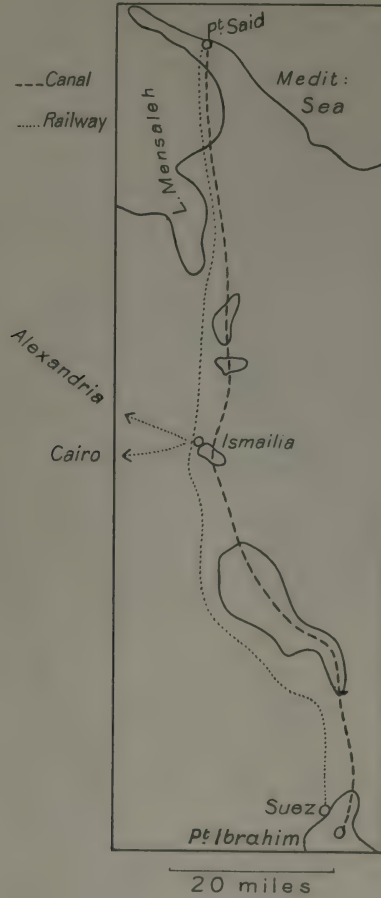
[Figures correct to within 25 miles]

St Helena (1673—handed over to the British Government by the E. India Co. in 1834), like Ascension, was a much frequented port of call in the old sailing days. **Jamestown** is the harbour and the island has long been fortified, but in 1906 the garrison was withdrawn.

Mauritius (1810) is a convenient port of call half-way between the Cape and India. **Port Louis** is a well-sheltered harbour with a considerable trade. The island may be compared to any one of the W. Indies; its latitude is the same, on the opposite side of the Equator; its soil is equally fertile; every kind of tropical production will flourish there and it specialises in the cultivation of sugar: it is liable, too, to the hurricanes that occasionally devastate the W. Indies. The Crown Colony of Mauritius includes other small islands near and also the Chagos Islands, the largest of which, Diego Garcia, has a

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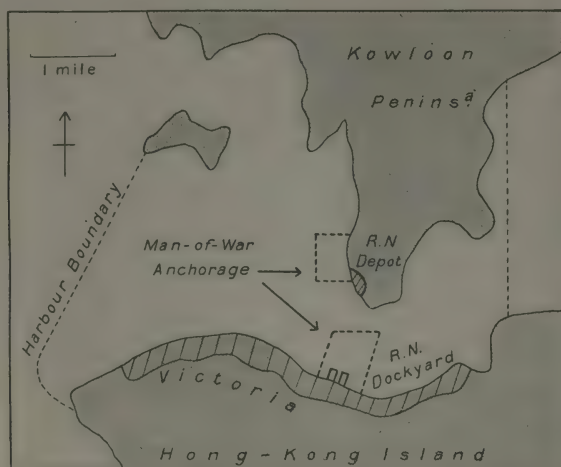
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safe harbour which is growing in importance as a coaling station : it is at the point where the direct route from Aden to Australia intersects that from the Cape to Colombo.

The **Seychelles** group (1794) also form a Crown Colony and **Victoria**, on Mahé Island, is an Admiralty coaling station. The islands enjoy a perfect climate and their fertile soil produces a luxuriant tropical vegetation.

Colombo, the great commercial junction of the Indian Ocean, has been dealt with already (p. 99).

The island of **Singapore** (1819) is the most important part of the Crown Colony of the Straits Settlements. It was acquired for us by the foresight of Sir Stamford Raffles. The harbour is extensive, with coaling wharves and Admiralty dockyard. Commercially it is the collecting centre of the E. Indies, and the development of the Malay States in recent years has contributed to its growth. It commands the main passage from the



Hong-Kong Harbour

Indian Ocean to the Pacific as well as the Sunda Strait in a minor degree, and is heavily fortified.

The Governor of the Straits Settlements is also responsible for **Labuan** (1846) which possesses coal-mines and a good harbour, **Sarawak** (1842), and **British North Borneo** (1888) which is directly controlled by a Chartered Company. These three produce considerable quantities of timber, tobacco and sago, which are marketed at Singapore.

Hong-Kong (1841) has a fine harbour, ten square miles in extent, formed by the shelter of the island along the north side of which lies the town of **Victoria**. It is a great commercial centre as it handles much of the Chinese trade with both Europe and N. America, and in point of tonnage of shipping is second only to London as a port. Being our furthest eastern outpost in the northern hemisphere it is a strongly fortified naval and military station. The Crown Colony includes a portion of the mainland opposite.

In the Pacific there are many islands under British control (see Atlas). They are of the oceanic type, the majority being of coral formation, and some contain good harbours. Nearly all are fertile and the chief articles of commerce are timber, sugar, copra, bananas and other fruits. With the exception of the Fiji group (1874) and British New Guinea (1888), which are Crown Colonies, they are under the control of the High Commissioner of the Western Pacific. The chief are:—the Solomon Islands (1877), Tonga (1900), New Hebrides (1906), and Fanning Island, acquired for ocean cable purposes.

Thursday Island, lying in Torres Strait, is an Imperial coaling station and is the headquarters of the pearl fishery of those waters. **Port Kennedy** is the harbour.

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